PREMATURITY, POVERTY-RELATED STRESS AND THE MOTHER-INFANT RELATION

By

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Several studies have suggested that putative associations between prematurity and disturbed parent-infant relations are due to factors directly associated with preterm birth; either (1) disturbed mother-infant bonding resulting from a prolonged period of infant hospitalization, or (2) physiologic characteristics of immaturity or dysfunction predisposing some preterm babies to difficult temperaments. However, prematurity has also been tied to various antecedent poverty-related social stresses which, if uninterrupted, could subsequently induce interactional dissonance between parent and child.

The present study has attempted to assess the relative contributions of both social stressors and prematurity-related risk measures to qualitative dimensions of the

mother-infant bond. Thirty-six preterm and 30 full-term mother-infant dyads (15 months post-conception) from a range of social classes served as subjects and were evaluated on a number of biomedical, behavioral, attitudinal and socioenvironmental measures. Specifically, prematurity, an obstetric-perinatal risk score and six indices of social stress were used to predict mother-infant interaction and maternal perception of baby temperament. The social stress measures included material resources, love-partner relations, social support, stressful events, maternal psychological functioning and maternal childhood history.

Utilizing both simple correlational procedures and multiple regression analyses, it was found that one stress variable, level of material resources, was overwhelmingly the major contributor of explained variance to the criterion measures, while other social stressors also played significant roles. Results were consistent in demonstrating that with increasing socioenvironmental adversity, mother-infant interactional dissonance heightened, and mothers reported a more negative and less well-differentiated perception of their baby's temperament. Prematurity and biomedical risk scores predicted aspects of the mother-infant relation only to a relatively minor extent, contributing approximately as much to overall explained variation as the least successful of the social stress measures.

Ancillary findings included significant associations between interaction style and maternal perception of

temperament. However, these relations became almost completely attenuated after an analysis of covariance adjusted for level of material resources. One further finding was that preterm mothers, as compared to a matched full-term group, reported significantly higher levels of psychological disturbance and love-partner discord.

It may be concluded that poverty-related stresses, often covarying with prematurity, exert profound influences upon the development of both preterm and full-term mother-infant relations. Future investigational and interventional strategies must more adequately address this issue.

CHAPTER 1

INTRODUCTION

The event of a complicated, premature delivery evokes a range of concerns and fears from both professional and parent. The phenomena of prematurity and low birth weight have been related to a host of adverse sequelae including mental retardation, epilepsy, learning disabilities, psychiatric disturbances, minimal brain dysfunction, and child abuse and neglect (Caputo & Mandell, 1970; Fomufod, 1976). Data upon which these associations have been based have not as yet permitted clarification of the underlying causal and contributory mechanisms. Several authors have either explicitly or implicitly hypothesized that it is the perinatal trauma accompanying prematurity that is primarily responsible for developmental adaptational failures. The smaller, younger and sicker the infant, the more at risk he is for serious developmental disorders (Lubchenko et al., 1963, Caputo et al., 1974, Wiener et al., 1965). Such investigaters posit some irreversible CNS damage that incapacitates the child in his efforts to learn and to adjust to the changing environment.

Still other students of the problem have presented evidence supporting the position that many of the sequelae of prematurity are more remotely related to birth status than generally assumed and are actually more directly a function

of social and environmental factors which happen to correlate with prematurity (Willermen et al , 1970; Wiener et al , 1969; Semeroff & Chandler, 1975). Not disregarding the inherent biologic risks the preterm infant must assume, these authors maintain that premature infants, with their varying degrees of physiologic intactness, make transactions within diverse matrixes of environments across development, and it is these organism-environmental transections that will largely determine outcome. A further assumption made with regard to the great majority of premetures is that the quality of the caregiving environment on both the microlevel of the family and the macrolevel of society can serve either to attenuate or to amplify the effects of any physiologic damage, transient or enduring

Historically, prematurity has been considered as one of a variety of perinatal events that could result in a "continuum of reproductive wastage" ranging from lethal to sublethal manifestations (Lilienfeld & Parkhurst, 1951) Lethal consequences first included stillbirths, abortions and neonatal deaths while sublethal components included cerebral palsy, epilepsy, mental deficiency and other possible disorders. Retrospective and prospective research conducted by Lillienfeld, Pasamanick & Knobloch over two decades served to extend this concept to include a broader and more elaborated range of sublethal conditions (Knobloch & Pasamanick, 1962). The original phrase became modified to its popularized version of "continuum of reproductive risk"

Recently Sameroff & Chandler (1975) have coined another phrase, "continuum of caretaking casualty", to denote the overlooked importance of socioenvironmental variables in the outcome equation for the reproductively risky.

The evidence for the various etiologic hypotheses of the last thirty years remains tenuous today. Parmelee & Haber (1973, p. 379) state:

> In a careful review of the literature it is by no means clear that the sequelae reported in later childhood are directly a function of prematurity or low birth weight or extrauterine life in an incubator.
>
> Poor outcome of the prematurely born or low birth weight infant may be entirely a function of prenatal, perinatal and postnatal trauma among these babies and an increased incidence of lower socioeconomic and educational status of their parents.

In an attempt to discern major influences in the ontogeny of the preterm child, we shall here review two interrelated aspects. The first, that of mental development, is included since it represents the mainstay of the psychological literature on prematurity and many of our theoretical advances in the area have derived from this source. We shall secondly examine mother-infant relations within a context of both biological prematurity and potential socioenvironmental influences, a topic quite relevant to current psychological debate.

Mental Development

Early retrospective studies of the relation between prematurity and mental development presented alarmingly

high incidence rates of premature birth among victims of cerebral palsy, epilepsy and mental deficiency (Lillienfeld & Pasamanick, 1954, 1955; Pasamanick & Lilienfeld, 1955) These investigations cast a far gloomier prognosis than was actually justifiable, however, since they were vulnerable to a number of methodological criticisms of retrospective research (including absence of adequate comparison groups, absence of accurate incidence rates of the disorder in the general population and lack of knowledge concerning peri-natal trauma and other possible covariants of prematurity)

Prospective studies of the intellectual development of prematures have revealed a significantly different picture in which small but consistent deficits in IQ have often been found among prematurely born children. Wiener (1962) reviewed 18 studies of prematurity, all but one reporting IQ deficits (mostly small). Douglas (1960) showed prematures to do less well at 8 and 11 years of age in school achievement and in performance on the British 11+ secondary school selection exam Drillien (1964) found birthweight among prematures to be inversely related to IQ at 4 years. As a follow-up to earlier studies of Lillienfeld, Knobloch and Pasamanick, Wiener et al (1965) and Weiner et al (1968) reported IQ differences averaging five to six points between prematures and controls at 6 to 10 years of age.

In a large-scale investigation, Braine et al (1966) tested 346 Black preterm (PT) infants and 50 full-term (FT) controls with the Cattell Developmental assessment scale and

also found an inverse relationship between birthweight and test scores. Corroborating these findings, the results of Rubin et al. (1973) have indicated that birthweight, rather than gestational age, is the major correlate of psychological and educational impairment. These investigators concluded that low-birth-weight and small-for-gestational-age* infants were at increased risk for school problems and for difficulties in mental and language development.

Not all findings have been in support of even small intellectual deficits among the premature. Robinson & Robinson (1965) reported no differences in IQ development between low-birth-weight and full-term infants when corrections were made for social class. MacDonald (1963, 1964) studied infants of birthweights less than four pounds. After excluding children with blindness, cerebral palsy, deafness and IQ's less than 50, the IQ's of the remaining children were equivalent to those children with normal birth records. Douglas & Gear (1976), in their long-term follow-up of the 1946 British National Cohort Study, report very few significant differences between low-birth-weight and normal-birth-weight individuals with regard to frequency of handicaps, teacher assessments and types of schools entered. Most recently, in a carefully designed study, Tilford (1976) tested groups of premature and full-term infants at eleven months and found the prematures and full terms to perform

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*Below tenth weight percentile for gestational age

equivalently on the Bayley Mental Scales

Why are there such ambiguities and contradictions of findings in these studies? There are several possible explanations. First, many of the studies differ in terms of sample size and composition, and the variables that are controlled. As an example, Lubchenko et al. (1963) reported a very high incidence of adverse sequelae of premature birth, but they examined only infants with birthweights equal to or less than 1500 grams, included no comparison group, did not control for SES and included a significant number of blind and visually impaired children. Tilford (1976), on the other hand, excluded small-for-date babies, multiple births and infants with any recognizable physical defects. Hence, lack of comparability of findings between these studies is assured

A second reason for the apparent conflicting results may be due to lack of comparability of samples from one geographic locale to another. Drillien (1972) has pointed out, for instance, that small-for-gestational-age births constituted a far larger proportion of her Edinburgh sample than of her London sample

Thirdly, Douglas & Gear (1976) have suggested that contradictory conclusions may arise due to the considerable iatrogenic hazards imposed by the innovations of early neonatal intensive care units in the 50's and 60's which had not been present earlier or since (e.g. elevated oxygen levels). Teberg et al. (1977) have provided evidence for this. Evaluating infants with birthweights of less than 1500

grams who were born from 1965 to 1970, they reported a dramatic decrease in abnormal outcome (from 20% to 3.3%) for infants born during the two-year period, 1969-1970, compared with those in the period, 1965-1966. Teberg attributed this pronounced shift to notable improvements in perinatal care (e.g. increased attention to ambient temperature in the nursery, routine monitoring of blood glucose levels and phototherapy for hyperbilirubinemia).

No matter what the source of discrepancy from study to study, one may reasonably conclude that prematurity and low birth weight, alone, do not account for a great deal of the variability with regard to IQ or DQ scale performance. What is truly remarkable is the magnitude of overlap in the IQ distributions of premature and full-term children which is replicated in the many available studies

Early Mother-Child Relations

Examining early mother-child relations among families of prematures is an interesting endeavor for several reasons. Firstly, mother-infant interaction has been related to both early and later competencies of the child (Yarrow et al. 1973; Elardo et al. 1975 & 1977, Yarrow et al. 1975), and the study of it may serve to elucidate processes underlying the putative associations between prematurity and development.

Secondly, a new literature has recently appeared which proposes that the first days after birth are especially critical for emotionally bonding a mother to her baby (Klaus &

Kennell, 1976). Since many premature infants are separated from their parents for as much as the first three months of life, this theory suggests that such early separations create difficulties in formation of attachments between infant and mother. These difficulties may, in turn, promote problems in various areas of the child's development.

Related to this last issue is yet another reason for examining the preterm mother-infant relation in detail. It has been reported that the incidence of child abuse is significantly higher among children born prematurely than among the general population (Klein & Stern, 1971; Fomufod, 1976). Proponents of the early bonding period theory hypothesize that prolonged early separation predisposes preterm infants to an increased likelihood of abuse (Klaus & Kennell, 1976). Others believe that early perinatal brain damage or immaturity contribute to difficult temperamental characteristics among premature children which may sometimes drive a mother to the extreme of abuse (Friedrich & Boruskin, 1976; Frodi et al., 1978). Study of early mother-child relations may enable us to discern the particular mechanisms mediating this association.

The actual literature on preterm mother-child relations is sparse indeed. Beckwith et al. (1976) found with a preterm group of 8-month-olds that maternal sensitivity to infant signals and mutually contingent responsiveness were related significantly to Griffiths and Bayley mental scores and the attainment of object performance. Cohen & Beckwith

(1977) reported ordinal position in preterm infants to be correlated to maternal caregiving behavior and early cognitive development. Specifically, at 3 and 8 months of age, first born infants received more responsive caring and greater stimulation, were generally interacted with more frequently and attained higher Gesell scores than later born children. Neither of these studies adds appreciably to our specific understanding of the premature infant, however, since unfortunately no comparisons were made to full-term contrast groups. All that can indeed be said is that with respect to those variables studied, mother-infant relations among preterms appear to be similar to those among full terms.

Wortis et al. (1963) studied a group of 30-month-old premature children and their families. In comparison to a full-term comparison sample, they found that preterm children were less likely to be recipients of praise and warmth from their mothers. They suggested these findings were due to the lower social class status typical of families of preterm infants.

Field (1977) examined face-to-face mother-infant interaction with 8-month-old premature, full-term and postmature infants. She reported differences between preterm and full-term which she interpreted as indicating more adequate, better-paced interaction among the full-term dyads. Interaction among preterm dyads was characterized by maternal behaviors that increased the likelihood of infant gaze aversion. The author related these differences to the

neurophysiologic and behavioral intactness of the infant as determined by medical diagnostic classification and neonatal behavioral assessment.

Lastly, Leiderman (1978), in a series of followup studies, attempted to address the question of whether early mother-infant contact influences subsequent maternal and child behavior. His design included an early-contact group of prematures whose mothers began caretaking within days after delivery, a no-contact group of prematures who were typically separated two to three months from their mothers, and a third comparison group of normal full-term infants who were discharged from the hospital shortly after birth. He studied these children periodically over a number of years. The earliest differences that surfaced between groups were displayed in maternal attitudes of both decreased commitment and lower self-confidence among the separated group. However, these differences disappeared by one month post-discharge. The separated group also exhibited less ventral-ventral contact with their mothers in the first months after discharge, but this also was completely attenuated after a year. In fact, by one year post-discharge, neither prematurity nor early contact was related to mother-infant interaction. What did become important at this time for predicting style of interaction were social class, play behavior of infant, and gender.

The studies here reviewed answer few pertinent questions. The last investigations mentioned provide some challenge to

the notion of the importance of an early bonding period. Field's research (1977) implies that biologic intactness influences the mother-infant relation, but she has focused, perhaps too narrowly, upon the mother-infant dyad, leaving one to wonder about what differences in broader social characteristics might exist between preterm and full-term groups. Wortis et al. (1963), on the other hand, confounded social class and prematurity, so we are again unable to deduce which is responsible for quality of mother-child relations. Future research should be sensitized to these problems and attempt to sort out relative contributions of independent influences.

Prematurity, Its Sequelae and their Relations to the Social Milieu

Prematurity, although often so treated, is not a phenomenon occurring in a vacuum. Neither solely medical nor physiological in nature, it is an event that has been shown to be related to a number of sociocnvironmental factors. An inverse relation between prematurity, and social class and ethnicity has been well documented (Niswander & Gordon, 1972, Knobloch & Pasamanick, 1962; Abramowicz & Kass, 1966). Prematurity occurs with substantially greater frequency among the lower classes, the Black, and women under 20 or over 35. Mental illness among expectant mothers, inadequate maternal nutrition and weight gain, relatively low levels of educational achievement, illegitimacy, little or no prenatal care and excessive drug use and cigarette smoking have all been tied to an increased likelihood of prematurity (Zax et al.,

1977, National Academy of Science, 1973). Perhaps then, the increased risk sometimes associated with prematurity is largely a function of antecedent and contemporaneous disordering socioenvironmental influences. Let us re-examine the above-mentioned literature incorporating the broader perspective of the social milieu.

Drillien (1964), as mentioned above, reported birthweight to be inversely related to favorableness of outcome at 4 years of age. However, she also reported social class influences were greater than those of birthweight in predicting outcome. Consequently, the data she presented suggest an interaction between prematurity and adverse social conditions, such that premature children of lower-class environments are most likely to be in the abnormal group. In a subsequent investigation, Drillien (1972) found that the abnormal sequelae accompanying small-for-gestational-age infants were manifest at 10 to 12 years in children from average or poor working-class homes but not in those from more upper-class environments. Braine et al. (1966) in their study of black, economically disadvantaged prematures, reported that impoverishment and disorganization of social environment made an important contribution with regard to their most impaired group of children.

In an important study, Werner et al. (1967) assessed the relative contribution of socioenvironmental variables and perinatal complications upon variations in physical and intellectual development of 2-year-olds. Using SES, family

stability and mother's education as indices of the quality of social environment, these investigators found that severity of perinatal complications played a very dramatic role in predicting 2-year Cattell DQ scores, but only for those children of low social class and those children of low and moderate levels of family stability and maternal education. Mean Cattell scores reported for children with (1) no complications (2) mild complications (3) moderate complications and (4) severe complications were for the high-SES group 102, 100, 104, 95, respectively, but for the lowest SES group, scores reported were 98, 96, 93, 61, respectively. Thus in the high-SES group there was a drop of seven IQ points from no complications to severe complications, whereas for the low-SES group there was a decrease of 37 points. Furthermore the mean for the high-SES group with severe complications was not significantly different than the mean for the low-SES group with no complications. Adverse social environments therefore clearly seem, at least, to magnify the effects of any perinatally caused trauma. With specific reference to low-birth-weight infants, Wortis and Freedman (1955) also concluded from their own findings that premature babies are particularly vulnerable to the effects of disruptive social factors.

Very recently, Neligan et al. (1976), in a study of preterm and small-for-date infants, demonstrated that socio-environmental influences and prematurity acted in consort to affect IQ at 6 years of age. They also concluded that such

family factors as how much the child is read to, degree of parental rejection, quality of child care, occupational class of family and mother's expectations for child were much more powerful in predicting later development than such biological variables as gestational age, birthweight or degree of perinatal complications.

Along other lines of research, Record et al. (1969) conducted a sibling study of normal children in which they found that IQ scores increased with increasing birthweight and that children born early tended to manifest lower scores. Still they reported that the largest part of IQ variation was accounted for by factors other than birth differences between siblings. In a subsequent publication, McKeown & Record (1971) reported that differences in test scores associated with duration of gestation and/or birthweight were indeed very small when comparisons were made between siblings or twins. Since between-family differences were far more pronounced than within-family differences, their research suggests that postnatal environmental factors are more important in accounting for IQ variation.

Using a discriminant analysis procedure, Smith et al. (1972) were successfully able to classify correctly 82% of normal and abnormal outcomes at 7 years of age for preterms using only 11 variables measured during the first year of life. Three of the four most powerful variables for prediction were mother's age, educational level, and IQ, all factors closely tied to the quality of the social environment of children.

The empirical picture that is revealed when the social milieu is included in studies of prematurity is one in which the quality of prenatal environment is likely to covary with quality of postnatal environment and that both may be determined by a third set of factors. As Sameroff & Chandler (1975, pg. 209) stated:

> A major flaw in prospective studies of traumatic variables is that such traumas cannot randomly be assigned to subjects. Behavioral deviation found in children who have had complicated births may not be caused by the complications themselves but rather by a third factor which influenced both the behavioral deviation and the birth complications. Low socioeconomic status appears to be such a variable.

It is noteworthy that much of the effort in assessing risk criteria with regard to prematurity has persisted to focus upon the elaboration and refinement of events and conditions essentially removed from any direct social context. The infant or child is isolated and tested as though he alone were the cause, the effect and the source of whatever modulating influences might affect his own development. Typically the model is a medical one. Parmelee et al. (1976), for example, utilize some 14 costly and time-consuming measurements of peri- and postnatal complications, psychophysiological variables and neurodevelopmental assessments to evaluate risk, while Caputo et al. (1974) doggedly maintain that the four traditional infancy-status measures of birthweight, gestational age, birth length and head circumference are the best indices for predicting outcome. Though socioenvironmental factors have been repeatedly implicated as important

for the determination of prematurity itself as well as for favorability of subsequent outcome, few studies have attempted to articulate the relevant social risk variables and to assess their relative contributions to development. An important endeavor therefore would be to map out just which social variables contribute to prematurity itself, which ones contribute to the adverse sequelae of prematurity and what are the mechanisms by which they exert their effects.

Socioeconomic status and social class, as powerful predictors as they might be, are global summary variables, crude approximations, in fact, of family and social life, and this may help to explain why some studies that control for these variables still report notable differences between samples of premature and full-term infants (Caputo & Mandell, 1970; Wiener et al., 1965, Goldstein et al., 1976). The actual mechanisms of the social environment-prematurity relationship may often be obscured by just this globality of the social class variable. Vast differences within social classes may not be taken into account, and an accurate, distorted picture could be revealed. More refined estimates of social environments may make it possible to increase our understanding of the area. When, for instance, Negligan et al. (1976) included in their investigation socioenvironmental variables that were more directly related to children's development than the factor of social class (e.g. caretaking environment and expectations for child), the effects of the child's social class origin were largely supplanted

A burgeoning literature concerned with social stress and its consequences on mental and physical health may facilitate such refinement but largely has yet to be applied to issues related to child development. It would appear that this may be one of the more profitable avenues of research for developmentalists in general. Already culturally and ecologically molded stressful conditions of life have been implicated as major causal factors contributing to parental practices and child development in six very diverse cultural settings (Minturn & Lambert, 1964). Specifically, it has been found that the situational constraints in a mother's immediate life space play a very important role as determinants of their responses to their children.

Stressful life experiences have been related to a variety of disorders, both physical and psychological in nature (Hollingshead & Redlich, 1958; Brown & Birley, 1968; Dohrenwend & Dohrenwend, 1974; Hamburg et al., 1974). Paykel (1974) and Brown et al. (1975) both provide evidence, for example, that acute episodes of schizophrenia, depression, suicide attempts and neuroses are associated with the occurrence of preceding stressful life events. Paykel (1974) found that depressed patients reported three times as many stressful events as normal controls in their recent experience. Additionally he found among a group of individuals with various mixed neurotic symptoms that there was a linear relation between the severity of symptoms and the amount of stress in their lives. Stressful experiences for these

authors typically included any events that require the employment of subsequent coping and adaptational mechanisms (e.g., loss of a job, divorce, moving, marital conflict or death of a loved one).

Social stress, in our society, has not proven to be uniformly distributed among the social classes. Caplovitz (1963) and Hollingshead & Redlich (1959) concluded from various research findings that individuals in lower classes must generally tolerate more unfavorable life situations and that these people suffer more social losses than higher-class individuals (e.g., loss of job, death of a loved one or unstable housing situations). Myers et al. (1974) reported in their study that twice as many people in the lowest social class, as compared to other classes, scored highly on a test of psychiatric symptomatology. Furthermore, both they and Markush & Favaro (1974) found strong linear relations between number of stressful life events and severity of symptomatology. (For further documentation, see Dohrenwend & Dohrenwend, 1969; Srole, 1962.) In an interesting review of several epidemiological studies of stress-related mental disorders, Kramer (1957) has emphasized that persistence of disorder is also a function of social class, the lower-class individual exhibiting more chronic symptoms due to his lack of supports and his failure to receive adequate treatment.

If it can be accepted that socioenvironmental stresses contribute in an important manner to the development of

various disorders in individuals and that they are more heavily distributed among lower social strata, then it would seem reasonable to assume that such umbrella variables as social class and social disorganization are useful here only insofar as they reflect differential levels of exposure of groups to stressful circumstances. In fact when Myers et al (1975) controlled for the number of stressful events in their investigation of the relations between social class, stress and symptomatology, an earlier found association between class and symptoms no longer obtained. They, therefore, concluded that the distribution of stress among social classes accounts for the association between symptoms and social class.

A social stress approach to prematurity may help to clarify some difficulties in the area. Specifically there is a substantial amount of support for the idea that families and mothers of prematures are considerably different than their carefully matched, same social class comparisons.

Douglas and Gear (1976) made note of the fact that even though their low-birth-weight infants were carefully matched with full-term controls with regard to several socioeconomic characteristics, there surfaced evidence that the two groups were not equivalent. Differences developed between the index and control groups that became more pronounced with the passage of time. Teachers, public health nurses, and Douglas' own assessments were all in agreement in concluding a relative lack of parental concern for their children's

welfare among the index group Additionally, fathers of the index group experienced more bouts of unemployment than their counterparts and exhibited a relative decline in social class Given the nature of the shifts occurring in this study, it would appear likely that these groups were different from the start and quite unlikely that the stimulus of a premature child was responsible for these types of changes over time

Several studies have found maternal psychological differences between preterm and full-term mothers matched for social class. Blen et al (1963), in a retrospective research in which they interviewed mothers of premature and full-term infants matched for social class, education, race and parity, reported that mothers of premature babies were more emotionally immature, had more disturbed family relations and were more negativistic in attitude than mothers of full terms. Utilizing a similar retrospective interview protocol, Gunter (1963) found greater feelings of inadequacy and greater anxiety among her group of mothers of prematures.

Worbis et al. (1963) found the homes of prematurely born 2½-year-olds to be characterized by a great deal of social disorganization. Many mothers of these children appeared subdued, apathetic and unhappy. Also, they reported a high incidence of serious depression among this group. Additionally, Negilgan et al. (1976) after controlling for SES, reported that their index group of preterm mothers

scored significantly higher than the comparison group of mothers of full terms on the Eysenck Neuroticism Scale.

These retrospective studies may only be considered suggestive of maternal differences predating birth since it is possible that the event of a premature birth and the extra concern that premature infants require may in some way affect maternal characteristics. Recently, however, Zax et al. (1977) have provided methodologically sounder support for the possibility that preexisting maternal psychological impairment may increase the likelihood of premature delivery. In a prospective study they demonstrated markedly higher rates of prematurity among both chronically depressed and chronically schizophrenic women than among normal controls.

A social stress analysis of these findings may then serve to reconcile differences found between social classes with differences found between groups within the same class. Just as stresses are not uniformly distributed among the various strata of society, so are they not uniformly distributed within any one particular class. Mentioned earlier were strong relationships between prematurity and prenatal care, illegitimacy, maternal age, nutrition during pregnancy, smoking and drug use. These appear to hold even within higher social classes (Reed & Stanley, 1977, Miller et al., 1978). This would imply that there are similar mediating factors at all social levels and would make stressful events and conditions likely candidates. Merely controlling for

social class variables then would hardly contribute to an understanding of differences in personality and in the total pattern of living habits between, for example, those pregnant women who do and do not seek prenatal care, and those who do and do not take adequate care of their bodies through proper diet and minimal drug usage. Such preexisting differences are likely to presage very enduring social and psychological pressures that will influence both family relations and general development of offspring.

Probable relations between social stress, prematurity and its sequelae should already be apparent. As noted previously, depression has been related to both high social stress and an increased risk of delivering a premature offspring. Uhlenhuth et al. (1974), in an urban investigation of the relations between symptom intensity, life stress and demographic variables, reported that higher stress and higher symptom intensity were found among women who were unmarried, youthful and of lower social class. Consequently here we have social stress and psychiatric disorder prevailing among just those groups of women with characteristics that make them high risk for premature delivery. It is not difficult to speculate further that, in this case, it is stress that precedes and follows childbirth. As Dohrenwend (1975) has written:

> If socioenvironmentally induced stress is an important factor in the etiology of various types of psychiatric disorder in general populations, then life events such as marriage, birth of a child, loss of a job and death of a loved one are strategic as more proximal

phenomena through which such stress is transmitted to individuals

Demonstrations of associations between perinatal complications, prematurity and social stress are already provided in the literature. Family conflicts and interpersonal, occupational and economic problems have all been shown to be associated with abnormalities of pregnancy in retrospective studies (Stott, 1957; Hetzel et al., 1961) Gunter (1963) compared mothers of premature babies with a matched control of full-term mothers, and reported that the former group indicated more stresses in their lives unrelated to their children, e.g. deaths, economic need, interpersonal problems and physical disabilities. In a recent prospective investigation, Gorsuch and Key (1974) found a number of abnormalities of pregnancy, including prematurity and low birth weight, to be related to self-reported stress and anxiety during pregnancy. Schwartz (1977) reported preterm mothers to experience a greater amount of stressful life events preceding delivery as compared to a group of full-term mothers. Reviews by McDonald (1968) and Ferreira (1965) have concluded that the better controlled studies have demonstrated that stress-related psychological differences are empirically tied to obstetrical and birth complications.

In an interesting study, Nuckolls et al. (1972) found that 'psychosocial assets' and stressful life changes, acting conjointly, were associated with risk of pregnancy complications including prematurity. 'Psychosocial assets' included

such factors as personal assets, marital stability, extended family and friend relations and attitudes toward pregnancy Specifically, women with few psychosocial assets who were subjected to numerous life changes manifested over 90% complications as compared with the 33% incidence rate of complications of women with high life change scores but who had many psychosocial resources

Psychosocial factors accompanying and contributory to prematurity then are often not short-term events likely to dissipate quickly, but, rather, are enduring aspects of the social ecology of the family. The arrival of a premature baby, with the accompanying frailty and special care required, may actually serve to exacerbate the effects of those factors, and this will inevitably make for largely negative consequences for the development of both the individuals and family relations

Relating maternal psychological functioning to style of interaction with the infant, Wortis et al. (1963) reported very few mothers of 2½-year-old preterm children to use praise in their daily interactions The authors emphasized that there was also very little maternal warmth directed toward the children as compared to a contrast group of full-term families

Negligan et al (1976) sent health visitors to visit the homes of both preterm and matched full-term 6-year-old children Their derived evaluations of home environment revealed that premature children were read to less often and were

much more likely to receive poor care from their parents than were the social class-matched comparison children. In summary, these investigators concluded that mothers of premature infants (as a group found to be more neurotic than full-term control mothers) were more rejecting but less oriented toward discipline than mothers of controls. This combination of rejection and permissiveness would appear particularly detrimental in light of the importance of the parent's function as guide for the development of early competence skills (Ainsworth & Bell, 1974)

Additionally of interest is evidence which shows those psychological and social stresses covarying with both prematurity and social class to have their own effects upon child development. Illegitimacy, strongly related to both lower-class status and prematurity, is associated with later behavioral and learning difficulties in children (Crellin, 1971). Infants delivered by very young mothers, also a very common occurrence among the poor and the premature, are reported to have a high incidence of developmental problems during childhood (Osofsky & Kendall, 1973) and are less likely than others to receive adequate maternal nurturance (Oppel & Royston, 1971). Furthermore, Rutter & Quinton (1977) found that maternal psychological disorder and marital discord each were highly associated with school age psychological disturbance

Copans (1974) has suggested that there is a paucity of well-designed studies exploring the relations between parental,

environmental and interpersonal stressors (e.g., economic stability, support from significant others, and emotional conflicts), and infant behavior. However, the closely associated area involving the relation between maternal anxiety and infant development has been somewhat explored.

Knoblock & Pasamanick (1959) found in a study of neuromotor development of 40-week-old infants that their degree of neuromotor disturbance bore a positive relation to the amount of tension shown by the mother at that time. Sontag (1966) and Turner (1956) both described babies of mothers who experienced a great deal of anxiety or stress during pregnancy. These infants were generally characterized as difficult babies, excessively irritable, hyperactive and often having feeding problems. Ottinger & Simmons (1964) administered an anxiety scale to groups of pregnant women, later comparing the crying behavior of babies of high- and low-scoring mothers. Results indicated that babies of highly anxious mothers cried more.

Davids et al. (1963) administered the Manifest Anxiety Scale to women during their third trimester of pregnancy. At eight months after childbirth mother's attitudes were assessed, and infants were given the Bayley Mental Scale and rated for mood. As compared to low-anxiety mothers, women who had been previously rated as highly anxious exerted more control over thier infants and manifested significantly more of a hostile attitude toward them. Additionally these

highly anxious mothers experienced more dissatisfaction with their role, more conflict in their marital relationships and were more irritable in their relations with both children and husband. Infants of highly anxious women scored significantly lower than babies of low-anxiety mothers on the Bayley and also received lower ratings for general emotional tone.

While anxiety is not necessarily a product of social stress, Spielberger (1975) has argued that situational stressors are largely responsible for anxious behavior Cohler et al. (1975b) also have reported that among women with no psychiatric history, the presence of stressful life situations is associated with increased hostility and anxiety Additional support for this stress-anxiety relation may be mustered from two studies which present evidence that higher anxiety levels, as measured by the Manifest Anxiety Scale, are to be found among the lower socioeconomic strata both for adults (Vassiliou et al (1967) and for children (Ziv & Luz, 1973). Such elevated levels of anxiety may be interpreted as responses to adverse social conditions.

Investigations more directly concerned with global social class influences upon parent-child interaction may also have some value in mapping out the relations between dissonant social milieu, family development and child behavior among families of both full-term and premature infants. Since even middle- and upper-class mothers of healthy infants often feel the pressure of assuming sole responsibility for their children

and the accompanying difficulties in adapting to the maternal role (Cohler et al., 1975b), lower-class mothers, especially the most disadvantaged among them, are likely to be faced by an unbearable situation from which there is no exit. The child abuse and neglect literature documents the dire extremity of the situation for some. The picture emerges of a poor, socially disadvantaged, isolated family burdened by the stresses of early pregnancy, living in difficult conditions with problems of housing, shortage of money, strained interparental and parent-child relationships, alcoholism and parental history of a disruptive childhood (Sills et al., 1977, Gil, 1971).

A less severe impression may be drawn from the social-class studies of child-rearing, one in which the lower-class mother, in contrast to the middle-class one, is portrayed as more restrictive and controlling and less in tune with the sensitivities of her young (Sears et al., 1957; Bayley & Schaefer, 1960, Beckwith, 1971, Tulkin, 1972). Tulkin & Cohler (1973) have reported that lower-class mothers less often reflected attitudes of acceptance of the emotional complexities of child-rearing and appreciation of the importance of social reciprocity, were less knowledgeable in the 'appropriate' ways to control aggression and felt less comfortable in perceiving and meeting their babies' needs, as compared to the middle-class mothers. Furthermore, the lower-class mothers were more likely to believe they had little influence over their infant's development

After viewing videotaped sequences of mother-infant interaction, Honig & Lally (1973) reported that lower-class mothers knew what they ought to do for their infants but didn't know how to do it. Synchronization of mother and infant behavior was out of phase, the tempo being "breath-takingly rapid" and the infant having no time to respond.

It must be noted here that studies dealing with social class influences upon early mother-child interaction neither investigate equivalent lower-class populations nor share a great deal of similarity of findings, although, as seen above, there is some consensus. Furthermore it is unreasonable to make grand generalizations about the nature of lower-class mother-infant relations since there is such variation in the ways that poor mothers interact with their children. Still the body of research in this paper provides fertile ground for speculation as to how particular adverse environmental factors can affect both the quality of family relations and subsequent child development. It is possible that it is only the most overburdened of poor mothers that constitute the real differences between lower-class and middle-class mother-infant behavior in these studies. Because of their plight, it may be that these mothers are particularly unable to meet their babies' needs, losing touch with baby's sensitivities and at times directing their own frustrations toward them.

This sense of frustration and lack of sensitivity may well result then in inhibited development in the offspring.

Schaefer (1970) studied 15- to 36-month-old, lower-class, black male children and their mothers, and demonstrated that hostilities in the mother correlated with hostility in the child, and this, in turn, with low mental test scores and low task orientation in the children. In a study of 36 poor mothers and their first-born infants, Clarke-Stewart (1973) found that early maternal behaviors, such as verbal stimulation, sensitivity to the baby's signals, and affection, bore a strong positive relationship to infant language, intellectual and social competence at 18 months.

In general, studies have shown that infants of warm, attentive, stimulating and encouraging mothers fare better in development than infants whose mothers are cold, hostile, inattentive, rejecting, restrictive and insensitive (Golden & Birns, 1976; Yarrow et al., 1973). Many of the social class studies of mother-infant relations emphasize that lower-class mothers often lack those interactive skills that foster cognitive, social, language and emotional development in children.

From the social stress literature, it becomes apparent that the most stressed of the lower class are isolated from the mainstream of society, they lack ready access to others and to resources of a material and spiritual nature. Consequently they find it difficult to cope with even a modicum of life change (Myers et al., 1975). Such individuals have a realistic perception of their hopelessness and maintain an external locus of control (Liebow, 1964). Because they

correctly believe that they lack control of their own destinies, they may be unlikely to discriminate between those aspects of the environment that provide useful information for subsequent behavior, and may find attempts to improve environmental conditions futile (Rotter, 1966).

Translated into maternal behavior, the overtaxed, impoverished mother may chiefly view her infant as one more source of stress. Likely herself to have experienced a disruptive childhood as well as an inadequate general education, she may lack certain basic competencies and social skills necessary for childrearing (Gunter, 1963, Wolkind, 1977). Furthermore, she seems often to believe that her behavior has little impact upon her infant's development (Tulkin & Cohler, 1973). Because of these factors and because of her own feelings of being externally controlled, she may fail to develop differentiated perceptions of her infant's behavioral style, abilities and communication signals. Since she often cannot even meet her own basic needs, she may become inattentive and unstimulating toward her baby. Consequently, the infant is not responded to contingently, and he himself is likely to fail to develop a generalized expectancy of control of the environment. Evidence partially supporting this hypothesis is presented by Gordon (1969), who found among poor families, that the amount of maternal verbal interaction directed toward an infant was positively related to how much the mother felt in control of her own destiny. This is further corroborated by Shipman

& Hass (1966)

> The lower class mother's narrow range of alternatives is being conveyed to the child through language styles which convey her attitude of few options and little individual power, and this is now being reflected in the child's cognitive development (pg 17)

The high-risk mother of a premature infant is likely to be a victim of such a web of poverty, hopelessness and social dissonance. She is often poor, young, unmarried and undereducated. Lacking adequate supports in the face of severe adversity, she may develop serious emotional problems or neuroses. As stressed as she already is, the birth and subsequent special care of her premature infant may often serve as the final entropic stressor that overwhelms an already overtaxed family system, at worst, resulting in abuse or neglect. At best in our society, this mother may plod along, taking advantage of whatever inadequate supports are available, her child doomed never to achieve full potential.

The putative relationship between child abuse and prematurity, which has been previously tied either to infant temperamental difficulty or mother-infant bonding problems, yields to another explanation within this social stress perspective, one both more obvious and more parsimonious. Prematurity and child abuse have each been tied to both general stressful living conditions and the more discrete stressful life events (Justice & Duncan, 1976; Gil, 1971, see above for prematurity). It would seem in fact that the poor prenatal care, inadequate maternal nutrition, excess drug use and psychological impairment so frequently encountered with pre-

term births are quite typical responses to adverse circumstances. In a very real sense, during pregnancy these women are already abusing and neglecting their developing offspring's body as well as their own. Does it not seem apparent that with continued extremes of stress, these women would be more likely than others (even within their own social class) to abuse their child after birth?

One may be able even to discuss possible mechanisms by which this situation, in particular, and the culture of poverty, in general, is perpetuated across generations. Not only are mothers of premature infants more likely to abuse, neglect or abandon these children (Fomufod, 1976, Klaus & Kennell, 1976), but Gunter (1963) has reported that her sample of mothers of prematures was much more often neglected or abandoned themselves during childhood than a comparison group of mothers of full terms.

Furthermore, Wolkind (1976 and 1977) studying pregnant women who had experienced lengthy emotionally disruptive childhood separations from their parents found that these women, in contrast to nonseparated pregnant women, were more likely to be pregnant at a young age, to be unmarried, to have housing difficulties, to report psychiatric symptoms and to perceive deterioration of health during pregnancy; in short, such a group represents high-risk candidates for premature delivery. The cycle becomes thus: stress and lack of preparedness induces prematurity, prematurity conjointly with stress induces parenting disorders, parenting

disorders induce nonoptimal development, nonoptimal development and stress induce prematurity and so on. Social phenomena associated with prematurity among the poor provide such a fabric of entrapment that it is difficult to believe that there is no such transgenerational legacy. Poverty, powerlessness, stress, mental illness, youthfulness, illegitimacy and drug abuse all conspire to perpetuate a resonating atmosphere of social disorganization.

Associations Between Early Social Influences and Development

Social environmental factors have been demonstrated to have significant effects upon both full-term and premature infant competencies, various investigators having discovered relationships between maternal sensitivities and infant cognitive development. Ainsworth & Bell (1974) and Stayton et al. (1971) both reported significant positive relationships between maternal sensitivity to baby's signals and infant scores on Griffiths and Bayley Mental Scales. Wachs et al. (1971) found important relations between home environment and Piagetian measures of cognitive development with infants as young as 7 months of age. Additionally, Bell (1970) found that maternal responsiveness was associated with the development of object permanence. Similar relationships have obtained with preterm infants. Beckwith et al. (1976) presented evidence that maternal sensitivity to infant signals and mutually contingent responsiveness are related significantly to 8-month Griffiths and Bayley mental scores and the attainment of object permanence.

Several studies already cited have provided evidence concerning existence of relationships between maternal tension, anxiety and hostility and delayed infant development (Knobloch & Pasamanick, 1959; Davids et al., 1963; Schaefer, 1970). It is suggested that these relationships derive a heavy contribution from the general social climate and support systems available to families. Specifically, the immediate microenvironment of the family serves as but a mediator of the larger social context of which it is part.

Knowledge of developmental problems in infancy may be very useful for selecting those children from poor, stressed backgrounds who are truly at risk. It is generally accepted that developmental delays during infancy are not predictive of later maldevelopment (Golden & Birns, 1976). While this may be true for the more affluent children of our society, Willerman et al. (1970) have found that lower-class babies with poor performances on infant mental scales often show significant degrees of later delay or retardation.

Recently, infant measures linked to the early social milieu of the child have been found to be more predictive of later development than the commonly used infant assessment scales. Elardo et al. (1975 and 1977) reported correlations between 6-month infant home environment measures and 36-month mental and language test performances to be twice the magnitude of those derived from infant developmental procedures.

Sameroff (1978) investigated relationships between maternal perceptions of their 4-month-old infant's temperaments, 30-month Bayley scores and 12-month mother-infant interaction measures. Early temperament scores were highly correlated with the later Bayley scores; the more difficult the mother perceived her child's temperament, the lower the Bayley mental scores. Tying this association to social interaction, mothers who early on reported that they had difficult babies tended at 12 months to stay away from them, look at them less and play with them less. In turn, these 12-month maternal measures of avoiding responses were inversely related to 30-month Bayley mental scores.

Sameroff's results can be interpreted in a few ways. One typically suggested in the literature (Sameroff, 1978; Thomas et al., 1968) is simply that a difficult baby is hard for a mother to deal with, and she may respond by turning off to the infant, thus withdrawing provision of adequate stimulation and caretaking necessary for the child's development of competence. Implicit in this view is that there is a high degree of correspondence between a mother's perception of her baby's temperament and the baby's real temperament. An alternative interpretation, however, is that veridicality will often be lacking between a baby's actual temperamental profile and the mother's perception of it. The mother's report may be conditioned by social pressures and anxieties essentially extraneous to her relations with her infant, such that the more stressed she is, the more

negative her perception of infant temperament will be, and the more likely she is to avoid interaction.

Whatever the mechanisms involved, the relatively strong association of early temperament and later development is noteworthy. Early reports of infant temperament have also been tied to the issue of later general psychological adaptation. Carey et al. (1977) found infant temperament profiles to be related to impulsivity and school adjustment at 5 to 7 years of age.

These studies together substantiate the view that the most accurate predictions from infancy to later development are derived from mother-infant social and emotional measures. By teasing out the separate effects of prematurity and familial social milieu upon early maternal and infant socio-emotional variables, we may begin to answer critical queries concerning continuity and discontinuity of development: why, for instance, the fate of the poor appears to be so well sealed that their school failure can be reasonably predicted from demographic information available from birth (Ramey et al., 1978)?

An awareness of the factors contributing so irrevocably to early and enduring failure could enable us to prevent a good deal of misery and holds promise for blocking a few of the self-perpetuating mechanisms of poverty.

Purpose of the Study: Objectives and Hypotheses

The purpose of this study was to investigate the relative contributions of social stress factors and birth

status upon variations in mother-infant relationship and infant development at 15 months post-conceptional age. Mothers of premature and mothers of full-term infants were interviewed concerning various possible sources of stress in their lives and also concerning their perception of their baby's temperament. Additionally, mother-infant interaction periods were videotaped and later coded for quality of interaction.

Hypotheses of the study included the following:

H_1 There would be more self-reported social stress among families of premature infants than among matched families of full terms.

H_2 Premature infant-mother interaction would not be significantly different from matched full-term infant-mother interaction in terms of qualitative dimensions.

H_3 Social stress would account for a larger percentage of the variation with respect to quality of interaction than would either birth status or perinatal complications.

H_4 Relations between social stress measures and mother-infant interaction for lower social class dyads would be similar to those for the group as a whole. In other words, similar patterns of correlations would obtain for both lower-class dyads and the entire group.

H_5 Maternal perception of infant temperament would not be significantly different between matched full-term and premature groups.

H_6 Social stress measures would be related to mother's perceptions reflecting difficult infant temperamental characteristics. Specifically negative mood, low adaptibility, withdrawness, low threshold of responsivity, biological irregularity, low distractibility and high intensity of response would be more likely to be reported by stressed mothers.

H_7 An inverse relation would obtain between level of social stress and degree of differentiation of maternal perception of infant temperament.

H_8 Perception of temperament and degree of differentiation of perception would each be associated with quality of mother-infant interaction. The less difficult the temperament perceived and the more well differentiated the perceptions, the more harmonious the interactions.

H_9 The associations between maternal perceptions of temperament and mother-infant interaction would be largely due to the social stress covarying with each. Consequently controlling for social stress, relations between the two would be expected to be negligible.

H_{10} Stress by prematurity interaction effects would be obtained for criterion measures, such that high-stress premature dyads would be most impaired in quality of mother-infant relations.

CHAPTER 2

METHODS

Subjects

Subjects in this study were 66 infants and their mothers. Groups were comprised of 36 index and 30 comparison infant-mother dyads, with an approximately equal number of male and female infants. The index group of infants was chosen from those premature infants referred to the Intensive Care Unit at W. A. Shands Teaching Hospital, Gainesville, Florida, who were born below 37 weeks gestational age with birthweights of 2500 grams or less. Comparison infants were selected from those healthy full-term infants with birthweights greater than 2500 grams who were born in the same hospital. No infants were included in the study if they manifested any obvious congenital abnormalities or serious physical handicaps. Groups were equated as much as possible on mother's age, race, socio-economic and marital status and parity. All infants were examined at as close to 15 months post-conceptional age as possible. Table 1 gives means and frequencies of each group for several demographic and birth-related variables.

Materials and Procedure

The protocol of the study included the following: Written informed consent was obtained from each comparison

Table 1

Means and Frequencies of Demographic and Birth Data for Entire Sample (n=66)

	Preterm	SD	Fullterm	SD
No. Ss	36		30	
Age of infant ($\bar{X}$ days)	197.66	23.93	190.20	15.07
Sex				
Male	19		16	
Female	17		14	
Race				
Black	17		13	
White	19		17	
Gestational age at birth ($\bar{X}$ weeks)	32.63	2.70	39.5	1.40
Mother's Age ($\bar{X}$ years)	22.72	5.90	23.77	4.73
Birth Order ($\bar{X}$)	1.77	1.19	1.50	.73
Birthweight ($\bar{X}$ grams)	1763.69	482.63	3255.07	419.79
Length of Stay in Hosp	27.32	16.93	3.60	1.96
Hollingshead Social Class Position ($\bar{X}$)	4.00	.63	3.50	1.04
Obstetrical and Perinatal Risk Score ($\bar{X}$)	11.27	5.20	3.70	4.26

group mother participating in the study with her baby. This was not necessary with the index group since our procedures had been integrated into a comprehensive medical and developmental assessment of premature babies at Shands Teaching Hospital. All mothers were given a brief explanation of the rationale and procedures involved. Specifically they were told that we were interested in studying the development of both premature and full-term infants and how such development related to the special needs, concerns and stresses of families of young infants. We requested that we be able to videotape mother-infant interaction in a playful situation and assess the baby's development using the Bayley Scale of Development (Bayley, 1969) and information obtained from medical records. We further asked mothers to answer a number of questions concerning both family stresses and temperamental characteristics of the infant. An assurance was given that all information obtained would be held in strictest confidence, and that its sole use was to further our understanding of the special needs, concerns and problems of families of premature and full-term infants.

All infant-mother dyads were first videotaped interacting in free-play situations in a quiet well-lit conference room in the hospital. The videocamera and recorder were located in plain view approximately 15 to 20 feet from the pair. The play period commenced on a foam mat, 6 feet by 6 feet, which was put on the floor toward one end of the room. Several nonsex-typed toys were placed in the

middle of the mat, and the mother was asked to get on the mat with her infant and try to get her baby to react to both her and the toys in a playful manner. Four minutes of this interaction were videotaped.

Following the social development procedures, a trained Bayley Scale tester entered and administered both mental and motor scales. The administration of the Bayley took approximately 20 minutes*.

Social stress interview. Each mother was then given a structured interview (modification of Kotelchuck, personal communication) designed to evaluate a number of social stresses and available supports in the lives of the families. Specifically this interview attempted to assess such features as household density and quality of living accomodations, educational level, family intrapsychic and economic stability, social isolation, recent disturbing deaths, illness, parental childhood history, and general attitudes toward the present living situation. Also a questionnaire was verbally given to the mother which assessed basic attitudes toward the infant (modification of Family Development Questionnaire developed by Resnick & Resnick, personal communication). Both interview and questionnaire required about 30 to 45 minutes to administer. Both schedules were designed to give numerical scores to every item obtained with a minimum of subjective evaluations. Weighted scores of various items were mechanically combined to yield overall scores for six a priori dimensions of social stress

*Bayley data were not included in the present study.

material resources (MR), quality of love-partner relation (LPR), degree of social support (SS), stressful life events (SLE), maternal psychological functioning (MPF) and adversity of maternal childhood history (MCH). A high score on any measure indicated a more negative situation. See Appendices A to C for details.

Perception of temperament scale. Finally mothers were verbally administered the Pedersen Parental Perception of Infant Temperament Scale (PPITS) (Pedersen, 1976). This instrument attempts to evaluate how parents view their infant along nine dimensions of temperament (i.e. regularity, intensity, threshold of reactivity, activity level, persistence, mood, approach-withdrawal, distractibility and adaptability). Administered as a card sort with six cards per dimension, mothers were requested to place cards with various descriptive statements of baby behavior in one of four mutually exclusive categories: 1) very much like my baby, 2) sometimes like my baby, 3) not at all like my baby, and 4) have no experience with item. An example is 'My baby always fusses when he wakes up from a nap." Since items for each dimension were scattered throughout the deck and several dimensions of the scale included mutually contradictory items (e.g. "My baby is always happy when he wakes up from a nap' versus the statement above), it was possible to evaluate not only those characteristics a parent views as typical of her baby, but also the degree of articulation and differentiation of parental perception of infant temperament

Scores for all temperament dimensions ranged from 0 to 10 A higher score on any one dimension indicated, for example, a more approaching nature, greater adaptibility, higher activity level, more positive mood or higher degree of differentiation of perception. The administration of this scale required about 15 minutes. Every item was carefully gone over with each mother in order to make certain that she fully understood its meaning

After giving this scale, the interview and the questionnaire, the session was concluded and the mother was gratefully thanked for her and her infant's participation

Perinatal medical risk assessment Perinatal and obstetrical complications have been frequently reported for preterm infants. A modified version of the Obstetrics and Perinatal Complications Scale (OPRS) designed by Cohler et al. (1975a) was used for this assessment. This scale consists of weighted scores for a number of events considered to be potentially hazardous to the infant, including pregnancy events such as infection, bleeding, hypertension, toxemia and diabetes, birth events including gestational age, birth measurements and Apgar scores and early postnatal events such as respiratory distress, hyperbilirubemia and patent ductus arteriosis. The data for this index were obtained from the obstetric history and delivery record appearing in the mother's hospital chart. A high score on this scale reflected more serious and/or a higher number of complications.

Infant and mother behaviors. The interaction episode was recorded from videotapes by trained observers unaware of the group membership of the subjects and without information concerning hypotheses. The behaviors observed were derived from Beckwith et al (1976) and consisted of three major categories maternal behaviors, child behaviors and reciprocal interactions involving both the child and mother Behaviors were time sampled every consecutive 15 seconds using a checklist. Maternal behaviors included positive verbalizations, verbal criticisms, nonverbal bids, repetitive nonverbal bids, staccato bursts, affectionate touch and interfering touch. There were three infant behaviors nondistress vocalization, smiles at mother and exploration Reciprocal behaviors were composed of contingent verbalization to infant vocalizations, maternal contingent positive responding, maternal contingent negative responding, baby contingent positive responding, baby contingent negative responding, face to face orientation and mutual gaze. In addition to the individual behavioral variables, three summary measures were computed: maternal positive regard, maternal negative regard, and proportion of mutual positive attentiveness. Definitions for each behavior are contained in Appendix D.

Interobserver agreement. Interobserver agreement was assessed on the basis of 15 cases spread out over the entire period of coding of subjects. Agreement was determined by the percentage of agreement for each behavior per

dyad. Agreement between two independent assessments for different behaviors ranged from .84 to .97

CHAPTER 3

RESULTS

The primary purpose of this dissertation research was to explore the relative contributions prematurity and social stress indices garner for prediction of quality of the mother-infant relation and early child development. To approach ascertainment of these rather global relational characteristics, we have chosen empirically to examine associations between both social stress and prematurity-related risk factors, on the one hand, and mother-infant interactional variables and maternal perception of infant temperament, on the other. The prematurity dimension was quantified dichotomously for analyses of variance (i.e. preterm vs. full term) and on a continuous range of prematurity-related obstetrical and perinatal risk factor scores (OPRS) for correlational and multiple regression analyses.

Both sample size and type of analysis varied according to hypothesis tested. For analyses of differences between preterm (PT) and full term (FT) groups with regard to mother-infant interaction, perception of temperament and social stress items, subgroups in each diagnostic category were selected in order to control for SES, race, parity, infant age, maternal age and education, and sex of child. For this set of analyses total sample size was 50. Table 2 lists

Table 2

Means and Frequencies of Demographic and Birth Data for Equated Subgroups (n=50)

	Preterm	SD	Fullterm	SD
No. of Ss	27		23	
Age of Infant ($\bar{X}$ days)	190.89	24.19	189.52	10.90
Gestational Age at Birth ($\bar{X}$ weeks)	33.29	2.74	39.20	.98
Birthweight ($\bar{X}$ grams)	1831.85	492.94	3221.30	430.11
Length of Stay in Hospital ($\bar{X}$ days)	25.96	16.06	3.56	2.02
Obstetrical and Perinatal Risk Score ($\bar{X}$)	11.59	4.91	4.39	4.59
Sex: Male	14		12	
Sex: Female	13		11	
Race: Black	11		10	
Race: White	16		13	
Mother's Age ($\bar{X}$ years)	23.07	5.53	22.57	4.37
Birthorder ($\bar{X}$)	1.52	.79	1.77	1.17
Hollingshead Social Class Position ($\bar{X}$)	3.93	.68	3.87	.99

means and frequencies of several demographic variables for each subgroup. In order to establish whether lower-class mother-infant interaction demonstrated similar patterns of correlation to those across social classes only dyads at Hollingshead social class levels 4 and 5 were examined (n=39). For the remainder of the analyses the entire sample data were used.

Social Stress and Prematurity

Intercorrelations between the various social stress measures are presented in Table 3. Adequacy of material resources was directly related to almost all other stress items. The fewer material resources available the more likely was the mother to report impaired love-partner relations and psychological functioning, adverse childhood experiences, a higher frequency of discrete stressful situations, and inadequate social supports. Most of these and other significant intercorrelations were moderate, accounting for typically between 5 and 10% of shared variance. However, maternal psychological functioning yielded two more powerful associations, that with love-partner harmony ($r=.51$, $p\leq.001$) and social supports ($r=.40$, $p\leq.001$).

To test the hypothesis that there would be more social stress among families of premature infants than among families of full-term babies, t-tests were performed comparing the matched subgroups of the two diagnostic categories. Means are presented in Table 4. One-tailed t-tests demonstrated significant differences between groups on scores

Table 3
Intercorrelations among Social and Biomedical Stress Items
(n=66)

	Material Resources	Love Partner Relations	Social Support	Maternal Psychological Functioning	Stressful Events	Maternal Childhood History
Love-Partner Relationships	.27**	----	----	----	----	----
Social Support	.19*	.34***	----	----	----	----
Psychological Functioning	.37***	.51#	.40#	----	----	----
Stressful Events	.25**	.37***	.16*	.18*	----	----
Maternal Childhood History	.26**	.22**	.33***	.17*	.11	----
OPRS	.15	.13	- 08	.17*	00	03

*p≤ .10
**p≤ .05
***p≤ .01
#p≤ .001

Table 4

Social Stress Items Means for Equated Subgroups

	Preterm (n=27)		Fullterm (n=23)	
	$\bar{X}$	SD	$\bar{X}$	SD
Material Resources	23.52	12.48	18.87	15.37
Love-Partner Relations**	14.89	16.04	5.95	8.28
Social Support	12.96	11.15	14.78	12.75
Stressful Events	6.15	5.98	7.87	8.80
Maternal Psychelegical Functioning*	25.78	18.70	16.22	21.85
Maternal Childhood History	14.65	12.77	13.96	12.30

t-test one-tailed significance

*$p \leq .05$

**$p \leq .02$

of love-partner conflict ($t=2.32$, $df=49$, $p\leq.02$) and maternal psychological functioning ($t=1.67$, $df=49$, $p\leq.05$). Mothers in the preterm group reported more discord with their love-partners ($\bar{X}=14.99$ vs. 5.95) and more difficulty in psychological functioning ($\bar{X}=25.79$ vs. 16.22). Subsequent χ^2 analyses of individual interview items revealed that PT mothers were more likely to experience frequent physically violent quarrels with their mates ($\chi^2=4.92$, $df=1$, $p\leq.03$), were more uncomfortable dealing with their mates in general ($\bar{X}=4.93$, $df=1$, $p\leq.03$), experienced more difficulties dealing in conflicts with their mate ($\chi^2=5.05$, $df=1$, $p\leq.03$), and disagreed more with mates concerning childrearing techniques ($\chi^2=7.76$, $df=1$, $p\leq.01$) than FT mothers. Furthermore, PT mothers reported a greater inability to handle their moods than FT mothers ($\chi^2=3.95$, $df=1$, $p\leq.05$) and were more likely to report infrequently playing with their infants ($\chi^2=5.13$, $df=1$, $p\leq.03$).

In general, these results give support to the hypothesis tested, although it must be remembered that the interview took place approximately 15 months postconception, and many of these differences could be interpreted as consequences of, rather as influences upon, premature delivery. However, the mothers did report that onset of love-partner discord (in particular, violent arguments) in almost every case predated the birth of the child.

Interaction and Behavioral Variables

The null hypothesis that mother-infant interaction would not be significantly different between PT and FT

groups was also tested using the matched subsamples. Two (diagnostic group) X 2 (sex) ANOVAS demonstrated significant differences for main effects with infant exploratory behavior ($F=4.37$, $df=1\ 49$, $p\leq.05$) and mutual gaze ($F=4.16$, $df=1\ 49$, $p\leq.06$). PT infants explored less ($\bar{X}=5.28$ vs. 8.04) and preterm dyads engaged in less mutual gaze than the FT group ($\bar{X}=.00$ vs. $.26$). There were no other significant differences between groups for any of the other interaction variables.

In order to ascertain whether the social stress factors in combination with the obstetrical and perinatal risk scale (OPRS) could more adequately predict interaction, the social stress measures were used with the entire sample. The correlation matrix of interaction variables by stress and OPRS measures is presented in Table 5.

Adequacy of material resources was the most potent predictor of mother-infant interaction, significantly correlating with 10 individual mother-infant behaviors and all summary measures. Lack of resources was inversely related to facilitative maternal behaviors including frequency of positive verbalizations, contingent verbalizations, contingent responsiveness and mutual gaze, and directly correlated with behaviors reflecting dissonant characteristics such as maternal criticisms, bombarding stimulation (staccato bursts), interfering touch, maternal negative responding and infant avoidant responding. Similarly lack of resources was associated with increased maternal negative regard,

Table 5

Correlations of Stress Items with Mother-Infant Interactional Variables (n=63)

	OPAS	Material Resources	Love Partner Conflict	Social Support	Stressful Events	Maternal Psychological Functioning	Maternal Childhood History
Maternal Behaviors							
Positive Verbalizations	-.11	-.44***	-.15	-.05	-.02	-.18	-.17
Criticisms	-.13	.35**	.13	.07	.28**	.09	.04
Contingent Verbalizations	.13	-.21*	.03	.01	-.00	-.08	-.06
Nonverbal Bids	.01	-.02	-.07	-.15	.08	.16	-.23*
Repetitive Nonverbal Bids	.15	-.21*	-.01	-.13	-.07	.25*	-.13
Staccato Bursts	.04	.31**	.03	-.16	.06	.00	-.10
Affectionate Touch	.17	-.14	-.03	-.01	-.09	-.09	-.06
Interfering Touch	.00	-.35**	.10	-.04	.25*	.15	-.02
Infant Behaviors							
Vocalizations	.17	-.11	-.02	.08	-.11	-.08	-.17

* p≤ .05
** p≤ .01
*** p≤ .001

Table 5, continued

	OPRS	Material Resources	Love Partner Conflict	Social Support	Stressful Events	Maternal Psychological Functioning	Maternal Childhood History
Smiles at Mother	.00	-.00	-.14	-.12	-.13	-.12	-.02
Exploration	-.36**	-.16	-.16	-.15	-.15	-.36**	-.17
Reciprocal Behaviors							
Maternal Positive Responses	-.03	-.39**	-.21*	-.26*	-.28**	-.23*	-.15
Maternal Negative Responses	.03	.23*	-.14	.21*	-.11	.08	.22*
Baby Positive Responses	-.06	-.12	-.13	-.07	-.11	.01	-.01
Baby Negative Responses	-.08	.37***	.06	.04	.11	.18	.07
Face to Face	-.03	-.07	-.24*	-.05	-.14	-.07	.06
Mutual Gaze	-.27*	-.28**	-.23*	-.14	-.16	-.27*	-.13
Summary Measures							
Maternal Negative Regard	.04	.47***	.04	-.08	.14	.17	-.04

Table 5, continued

	OPRS	Material Resources	Love Partner Conflict	Social Support	Stressful Events	Maternal Psychological Functioning	Maternal Childhood History
Maternal Positive Regard	-.02	-.50***	-.21*	-.16	-.18	-.27*	-.18
Proportion Positive Responses	-.05	-.54***	-.12	.02	-.20	-.23*	-.03

* $p \leq .05$
** $p \leq .01$
*** $p \leq .001$

decreased maternal positive regard and a lower proportion of mother-infant positive responses.

The three next most powerful predictors of interaction turned out to be maternal psychological problems, love-partner conflict and stressful situations, significantly relating to six, four and three behavioral measures, respectively. Rather than correlating with both negative and positive measures, however, these variables were generally only inversely related to positive measures. In contradistinction to the material resource measure's rather strong relations to several of the interaction variables, these other social stress measures' associations with interactional behaviors were generally quite moderate.

Adversity of maternal childhood history and lack of adequate social supports each were moderately correlated with just two behavioral measures, all in the predicted positive direction with discordant behaviors and negative direction with more synchronous interactional variables.

Finally the prematurity-related OPRS scores were also related to two variables, infant exploration and mutual gaze: the higher the biomedical risk, the less exploration and mutual gaze tended to occur.

On the basis of these analyses, it appeared confirmed that poverty-related social stress measures were far more powerful in predicting certain qualitative behavioral characteristics of mother-infant interaction than either prematurity or prematurity-related obstetric and perinatal risk

factors. Both biomedical risk variables were associated with only two individual behavioral items and obtained almost zero-order correlations with each of the summary measures. On the other hand, material resources, alone, produced some very striking associations with many individual behavioral items as well as with all the summary measures.

Multiple regression analyses were subsequently performed in order to ferret out independent contributions of the individual stress measures upon interaction and also to gain some estimate of the total amount of variance for which the various predictors could account. A stepwise procedure was utilized for each interaction variable whereby the material resource measure was entered first into the regression equation and then followed by whichever variable next accounted for the most significant proportion of behavioral variance. Also stress by OPRS crossproduct sums were entered last in order to determine whether interactions between these variables played a significant role.

Results indicated that once material resources was entered into the regression, other social stress measures and interaction effects typically did not significantly add to the amount of explained variance. The only exception to this was maternal staccato bursts where r^2 increased from .09 to .15 with the addition of the social support measure ($F_{2,60}=3.63$, $p \leq .05$).

Behavioral interaction variables with which both social stress and biomedical risk were significantly related were

also submitted to regression analysis by entering the social stress variable first. For infant exploration, maternal psychological functioning was forced into the regression first and obtained an r^2 of .13. By then entering OPRS scores the r^2 was increased to .22 ($F_{2,60}=6.92$, $p\leq.05$). Similarly regressing upon the mutual gaze item, material resources was entered first and OPRS second, and the r^2 increased from .8 to .13 ($F_{2,60}=3.88$, $p\leq.05$).

What may be concluded from this set of analyses is that (1) the material resource measure used represented a relatively good summary measure of other poverty-related stress items which correlated with it, and (2) the overall amount of mother-infant interactional variation accounted for by prematurity-related factors is negligible in comparison to that accounted for by more sociocnvironmental variables.

In order to assess whether patterns of stress by interaction correlations would be similar for lower-SES mother-infant dyads to those for across-SES level dyads, a correlation matrix was constructed for all Hollingshead class 4 and 5 subjects (n=39) utilizing the two stress items which turned out to be most predictive for the entire sample (Table 6).

Upon comparison of the two matrices it became apparent that quite similar patterns of association did obtain. For example the material resource measure in each sample tended to be negatively related to maternal positive verbalization,

Table 6

Correlations of Selected Stress Items with Mother-Infant Interactional Variables for Lower Class Subgroup

(n=39)

	Material Resources	Maternal Psychological Functioning
Positive Verbalizations	-.25*	-.17
Criticisms	.29**	.00
Contingent Verbalizations	-.24*	-.16
Repetitive Nonverbal Bids	.04	.25*
Interfering Touch	.31**	.10
Infant Exploration	.01	.35***
Face to Face	.13	-.27*
Mutual Gaze	.04	-.29**
Maternal Negative Regard	.30**	.08
Maternal Positive Regard	-.27**	-.24*
Proportion Positive Behaviors	-.30**	-.11

* $p \leq .10$
** $p \leq .05$
*** $p \leq .01$

contingent maternal verbalization, maternal positive regard and the overall proportion of positive mother-infant behaviors, while being positively associated with maternal criticisms, interference and general maternal negative regard. Maternal psychological functioning was positively related in each sample to repetitive nonverbal bids and negatively related to infant exploration, mutual gaze, and general positive maternal regard. Hence, even within the lowest social classes it would appear that the less adequate the material resources and the more emotionally impaired the mother, the more likely the mother-infant dyad is at risk for interactional dissonance.

Maternal Perception of Infant Temperament

Once again the smaller matched subgroups were compared using a 2 (diagnostic group) by 2 (sex) ANOVA design with the temperament measures as dependent variables. There was only one significant main effect, that of infant mood and prematurity, $F=4.97$, $df=1$, $p \leq .03$. PT babies were reported to have a generally less positive mood than FT infants ($\bar{X}=7.07$ vs. 8.39).

The correlation matrix of temperamental dimensions by social stress and OPRS factors for the entire sample is presented in Table 7 and reveals a significant pattern of relationships between the reported temperament variables and the social stress and OPRS. The OPRS significantly related only to maternal perception of mood, but the social stress predictors were significantly associated 15 times,

Table 7

Correlations of Stress Items with Temperament Dimensions (n=66)

	OPRS	Material Resources	Love Partner Relations	Social Support	Stressful Events	Maternal Psychological Functioning	Maternal Childhood History
Activity	-.11	- 20	- 18	- 09	- 03	- 12	- 01
Rhythmicity	10	- 24*	- 01	- 04	- 02	- 07	- 18
Adaptibility	10	- 35**	- 09	- 17	- 09	- 20*	10
Approach-withdrawal	- 16	- 29**	- 24*	- 04	- 30**	- 21*	15
Threshold	- 10	- 36***	- 06	10	- 06	.05	10
Intensity	- 00	- 19	- 10	- 07	- 21*	13	08
Mood	-.32**	-.29**	- 20	- 17	-.01	- 43***	10
Persistence	07	- 16	- 01	12	- 03	- 06	13
Distractibility	- 01	- 25*	- 07	- 07	- 07	- 02	.02
Differentiation	- 11	- 38***	- 15	- 30**	- 14	- 13	- 26*

* p ≤ .05
** p ≤ .01
*** p ≤ .001

with an additional 10 coefficients tending toward significance ($p \leq .10$). In every case they supported the hypotheses tested: (1) The more stressed the mother, the more likely she would be to report negative and difficult temperamental qualities of her baby; (2) The more stressed the mother, the less well-differentiated her perception of her infant's temperament would be. Specifically, these correlations revealed that lack of stress was positively associated with reports of high adaptibility to new situations, biological regularity of function, approach rather than withdrawal from new stimuli, a predominantly positive mood, a relatively high threshold of reactivity, a low level of intensity of response, and a high level of distractibility. Furthermore, three of the social stress predictors were inversely related to the differentiation of infant temperament measure such that the more well-differentiated perceptions of infant temperament tended to be expressed by the least stressed of the mothers. It should be noted that, as with the interaction variables, the material resource measure is the best predictor of the various dimensions of maternal perception of baby temperament, significantly relating to or tending toward significance with all temperament items.

The final analysis for the temperament dimensions was a multiple regression again using the stress variables and OPRS as predictors. The results are presented in Table 8. Variance accounted for ranged from a low of 6% with biological rhythmicity to a high of 33% for predominant mood. As

Table 8

Multiple Regression Coefficients
(n=63)

	Activity	Regularity	Adaptibility	Approach	Threshold
Material Resources	--	.25	.35	.36	33
Love Partner Relation	--	--	--	--	--
Social Support	--	--	--	--	--
Stressful Situations	--	--	--	--	--
Maternal Psychological Functioning	--	--	--	--	--
Maternal Childhood History	--	--	.41	.45	--
OPRS	--	--	--	--	--

Increments only reported when $p \leq .05$

Table 8, extended

Intensity	Need	Persistence	Distractibility	Differentiation
.23	--	--	.26	.39
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
.36	.48	--	--	--
--	.57	--	--	--
--	.54	--	--	--

with the behavioral measures previously reported, it was the material resource measure that contributed overwhelmingly the largest portion of explained variance.

Relations Between Behavioral Measures, Reports of Temperament and Social Stress Factors

Table 9 presents simple correlations between scores on dimensions of perceived temperament and behavioral interaction variables. An examination of the matrix indicates support for the hypothesis that relations would obtain between perceived difficulty of temperament and differentiation of perception on the one hand, and mother-infant interactional behaviors on the other. Differentiation of maternal perception of infant temperament was directly associated with maternal positive regard, proportion of positive mother-infant behavior and several individual items reflecting harmony of interaction. This measure was furthermore inversely related to maternal negative regard, infant avoidant behavior and several other dissonant interactional variables. Most of these correlations are relatively strong ones. Associations between specific temperament dimensions and interaction also conformed to the predicted directions. For example, babies perceived to be more adaptable tended to demonstrate less avoidant responding and to receive more positive verbalizations, fewer criticisms, more maternal positive responses and more positive maternal regard. Similarly infants reported as predominently positive in mood, explored more, avoided less, and received less negative maternal regard and more positive maternal behaviors. Other temperament

Table 9

Correlations of Mother-Infant Interactional Variables with Temperament Dimensions (n=63)

	Activity	Regularity	Adaptibility	Approach
Positive Verbalizations	.40***	.12	.25*	.14
Criticisms	.14	-.19	-.24*	-.13
Nonverbal Bids	.04	.12	.07	-.19
Repetitive Non-verbal Bids	-.21*	.07	-.01	-.28**
Staccato Bursts	-.06	-.00	-.12	-.33**
Affectionate Touch	-.17	-.03	.09	.16
Interfering Touch	-.14	-.03	-.09	-.23*
Vocalizations	-.15	-.30**	-.05	.13
Smiles at Mother	.25*	-.01	.16	.00
Exploration	.14	-.06	-.15	.13
Maternal Positive Responses	.13	.15	.20*	.19
Maternal Negative Responses	.11	-.21*	.02	-.12
Baby Pos Resp	.17	-.02	-.02	-.04
Baby Neg Resp	-.15	-.08	-.21*	-.26*
Face-to-Face	.19	-.12	.02	.04
Mutual Gaze	.20	.04	.09	.03
Maternal Neg. Regard	-.15	-.00	-.13	-.37***
Maternal Pos. Regard	.25*	.11	.27*	.22*
Proportion Pos Responses	.23*	.09	.21*	.39***

* $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$

Table 9, extended

Threshold	Intensity	Mood	Persistence	Distractibility	Differentiation
.26*	-.05	.25*	.06	.23*	.39***
-.20	-.10	-.12	-.24*	-.27*	-.04
.01	.04	-.25*	-.06	.01	.12
-.13	-.02	-.33**	-.10	.12	-.10
-.40***	.08	-.33**	-.11	-.14	-.26*
.09	-.11	.07	.03	.03	.07
.06	-.16	-.25*	-.21*	-.31**	-.35**
.02	-.04	.10	.22*	-.23*	-.00
-.13	-.03	.15	-.06	-.09	.18
.10	-.03	.29**	-.13	.03	.16
-.03	-.03	.13	-.17	-.01	.43***
-.17	.09	-.10	-.03	-.04	-.25*
-.02	.17	-.03	.05	-.20	.08
.05	-.03	-.25	.01	-.04	-.36**
-.11	.19	.10	.04	-.16	.10
.09	.19	.22*	.17	-.14	.18
-.25*	-.03	-.40***	-.21*	.23*	-.36**
.13	-.05	.25*	.03	.11	.47***
.25*	.07	.46***	.21*	.20	.44***

items demonstrated similar relations

Since temperament perception, social stress and behavioral interaction items each were correlated with the other, a multiple regression analysis of covariance was performed to determine whether associations between perception of temperament and mother-infant interaction were largely due to the social stress covarying with each. Level of material resources was chosen as covariate both because it was deemed unlikely to be influenced by either other set of variables, and because it had been proven in prior analyses to be the best single measure of poverty-related stress. Eight behavioral items--four positive and four negative--were chosen on the basis of their being significantly correlated with material resources and at least tending towards significance with at least two temperament dimensions related to difficulty. Six of the eight behavioral items had at least three associations with measures of difficult temperament. They were mutual gaze, positive verbalizations, maternal positive responses, maternal positive regard, criticisms, staccato bursts, baby avoidant behavior and maternal negative regard.

The material resource indicator was first forced into the regression equation, and then whichever temperament variable most significantly contributed to the explained variance was next entered.

Only for two of the eight behavioral variables did a temperament measure significantly contribute additional

explained variance, and for each item the amount contributed was far less than the simple r^2 of the temperament dimension alone. Hence threshold of reactivity (simple r^2 = .16) increased the r^2 from .09 to .18 for staccato bursts, while the additional contribution of mood score to variation in maternal negative regard increased the r^2 from .22 to .28, far less than its simple r^2 of .16. These analyses suggest that it is the level of poverty-related stress that largely influenced both perception of temperament and mother-infant interaction. Although perception of temperament did occasionally supplement the amount of explained variation, at least with regard to the present set of variables its influence would appear relatively insignificant.

CHAPTER 4

DISCUSSION

In summation, prematurity was shown in the present study to be negligibly related to mother-infant interaction and maternal perception of infant temperament. The more important associations with these criterion measures were gleaned of variables derived from our social stress interview. More specifically, factors related to social stress, particularly a measure of adequacy of material resources, were tied to almost every aspect of interaction and temperament. Various dimensions of maternal perception of infant temperament also correlated with interaction variables. However, analyses of covariance suggested that once level of material resources was adjusted for, the temperamental dimensions were either very modestly or not at all related to the total explained interactional variation. Relations between prematurity, social stress and mother-infant bonding were somewhat complicated by our finding that preterm mothers reported higher levels of love-partner discord and psychological problems than carefully matched full-term comparisons.

That families of premature children differ from their matched full-term comparisons with respect to social stress variables is not a unique finding. Zax et al. (1977),

mentioned earlier, found an increased incidence of prematurity among women chronically disturbed before pregnancy. Also previously cited retrospective studies have provided further support for this relation (Gunter, 1963, Schwartz, 1977, Negligan et al., 1976).

Though causal inferences cannot ultimately be deduced from the present findings, certain key issues are nonetheless brought to the fore. First, the very association of maternal psychological and interpersonal problems with prematurity, whichever situation comes first, is likely to place the preterm at a risk conditioned largely by socio-environmental forces. Both love-partner discord and maternal psychological disorder have already been related to adaptional failures among children (Rutter & Quinton, 1977). Focussing upon either medical aspects of prematurity or academic questions as to whether maternal disturbance and stress precedes or follows premature birth would seem to be begging the most important issue which is what can be done to best insure adequate child development.

Besides, not only are there good indications that stressful environments are likely to be encountered by premature infants once born, but we also already possess evidence that specific adverse conditions are likely to precede these children's births. Irrespective of social class, certain maternal behavioral practices during pregnancy consistently have been related to low birth weight and premature delivery (Miller et al., 1979). Specifically poor prenatal care, early or

lata pregnancy, inadequate nutrition, cigarette smoking and drug and alcohol usage have all been associated with low birth weight. These maternal practices are certain to reflect problematic patterns of living for many of the women involved, even though these living styles have not yet been fleshed out in the literature. Several studies, however, do present evidence highly suggestive of links with these particular patterns of living (Nortis et al., 1963, Nortis & Freedman, 1966; Negligan et al., 1976). Gunter (1963) for example, identified a significantly higher number of social, sexual and psychological problems among mothers of prematures as compared to a matched full-term comparison group. Schwartz (1977) found that preterm mothers reported many more stressful life events preceding and during pregnancy, indicating instabilities in financial, social and interpersonal areas.

The apparent covariation of prenatal and postnatal socioenvironmental adversity for many preterm families may bear directly upon the issue of frequently cited associations between child abuse and prematurity. Both phenomena frequently erupt in impoverished, stressful environments where support systems are generally unavailable or inadequate (Samaraff, 1978, Gunter, 1963; Garbarino & Crouter, 1978). Our results, suggesting more psychological impairment and love-partner discord among preterm mothers as compared to a matched full-term group, are consonant with findings in abuse populations of high levels of marital maladjustment

end maternal emotional impairment (Parke & Collmer, 1975, Hunter et al , 1975). An additional related finding of ours indicated that frequent violent love-partner altercations were characteristic of certain preterm families but of none of the matched controls, and in every case reported this fighting had been occurring prior to the birth of the target child. Parental condonement of physical violence and a gross level of social stress have already been identified as two of the most important conditions necessary to set the stage for an act of child abuse (Gerbarino, 1977). Our data would indicate then that preterm infants, may, merely on the basis of their antecedent and contemporaneous dissonant environments, be at increased risk for abuse.

A last comment should be made with regard to this prematurity-child abuse association. Certainly in some instances one may easily conceptualize the two types of events as reflecting a single phenomenon occurring at different stages of the developing organism's life cycle. A pregnant women who inadequately nourishes herself, obtains little or no prenatal care, smokes cigarettes, excessively uses drugs and/or drinks with frequency is in a very direct manner already maltreating her own body and that of the fetus growing within her womb. It would seem probable that such prenatal abuse would covary with postnatal abuse among women responding to economic and psychosocial privation.

Our results suggesting associations between prematurity and two indices of social dissonance make previous

interpretetion of developmentel outcome of the preterm infent rether difficult. Prematurity in our study wes to e moderete extent confounded with both love-partner discord end maternel psychologicel functioning. To recognize thet such confounding of social end physiological variebles goes beyond the beunderies of our own findings, one need merely ecknowledge the existence of en entire litereture (previously cited) which indicetes thet verious socioenvironmentel pressures predispose some women to eerly lebor. An ettempt to tease epart these intertwined influences would seem beyond the present stete of the ert. Hence it must be kept in mind thet when we speek of developmentel risks ettendent to prematurity, we ere most likely inevitably confounding socie1 fectors with medicel end physiologicel veriebles.

Be thet es it may, neither prematurity or perinetel risk wes significently essocieted with more than a few of our criterion measures. In those ceses where e reletion did obtein, socie1 stress variables eccounted for e greeter then equel shere of the verietion.

One of our hypotheses which was not confirmed concerned the expectation that the mother-infent reletion would be influenced by interection effects between stress fectors end obstetric-perinetel risk. The fect thet such effects were not encountered suggest to us one of two explenations: (1) Previous studies (e.g. Drillien, 1964, Werner et el., 1967) demonstreting socie1 cless by prematurity interection effects heve lergely utilized stenderdized essessments of

intellectual functioning as dependent variables. More qualitative measures such as those reflecting aspects of mother-infant relations may not produce the same structure of molding influences. Thus, synergism of etiological factors with one outcome measure may yield to additivity of influences of the same factors with a different outcome measure. (2) Previously cited interaction effects may have resulted from the confounding of social stress variables with prematurity. Assuming that etiologies of prematurity may range from largely social causations to purely physiological ones, and further assuming that social etiologies may be proportionately greater in the lower social classes (cf. Miller et al., 1978), the class by prematurity interaction may be wholly explicable in terms of social stress. Lower-class preterm mothers would be more stressed than either their same-class full-term comparisons or higher-class preterm and full-term groups. Hence, what is taken for some inherent vulnerability of the premature infant may actually be the increased adversity of environment of the lower-class premature infant. Since our research model more directly confronted the social stress issue, such confounding may have been largely avoided.

If prematurity and its accompanying complications, acting alone, typically do not appear substantially to jeopardize development, efforts toward understanding adverse sequelae would seem largely misguided when aimed at fundamentally biomedical and neurophysiological issues (e.g.

Parmelee et al , 1976) Our data and others (Richardson, 1976, Sameroff & Chandler, 1975) have convincingly demonstrated that apparently physiological events are often primed by enduring disadvantageous socioenvironmental and psychosocial conditions which also proceed to impair subsequent functioning.

Hence current evidence concerning prematurity is at variance with contemporary approaches for researching associated effects. Our findings support the idea that families of premature infants may be at increased risk for development because of the pronounced existence of socioenvironmental dissonance. The general agreement among professionals that prematurity be used as an alerting signal for intervention is not in itself satisfactory. The differences concerning how the signal is interpreted will largely determine the mechanics of support for the preterm child and family. Unfortunately, the most popular directions (e.g. Klaus & Kennell, 1976; Parmelee et al., 1976) seem governed by very limited hypotheses often likely to camouflage the actual structure of the problem. For example, Parmelee's cumulative risk score design evaluates risk on the basis of 14 costly measures assessed from birth to 9 months of age and includes such items as obstetrical complications, sleep polygraphs, pediatric examinations, visual attention tasks and cognitive tests. On the basis of such an assessment, intervention would almost necessarily be aimed at a remedial approach directed toward specific areas of developmental

deficit. Klaus & Kennell (1976), on the other hand, operating from their sensitive bonding period hypothesis, inevitably focus upon parent participation in the neonatal intensive care unit with provision of some very directive psychological support for the family while the infant is hospitalized. Both approaches may help, but each are derived from very constrained theoretical perspectives which largely preclude more comprehensive recruitment and provision of support systems that several studies imply to be necessary for the adequate development of many preterm families.

Results of the present study serve to challenge such limited conceptualizations. Our preterm infants typically spent rather long periods in the hospital ($\bar{X}$=27 days) and no systematic attempts were made by staff toward facilitating bonding baby and parent. Our full-term babies, on the other hand, had frequent daily contact with their moms, and both mother and baby were at home within a few days. Yet no dramatic interactional differences were discerned at 15 months post-conception. Instead it was the social stress variables, cutting across diagnostic categories, that best predicted interactional variance and perception of baby temperament. What is therefore implied is a more comprehensive model of causation and outcome for prematurity in which concurrently existing social disadvantage and stress play the most significant role. Broad social strategies for reducing degree of social stress at the family level are the obvious implications with regard to interventional approaches.

Just which stressors we should focus upon is also hinted at in our findings. Adequacy of material resources was predictably related to almost every criterion measure. That this composite variable should have been the most powerful predictor of mother-infant interaction and perception of infant temperament is not difficult to explain. It certainly represented the most all-encompassing assessment of the ongoing life situation of our subjects, taking into account income level, range of maternal role, housing adequacy, maternal education and size of family. The fact that maternal childhood difficulties demonstrated the fewest significant correlations with criteria measures implies on the other hand, historical events may be less important than contemporaneous perturbating influences, and indeed that they may be relevant only insofar as they relate to these current stresses. Supporting this notion, Frommer & Shea (1973) found that problems with infants were more related to current marital difficulties than to childhood experiences among mothers.

Results of the present study may help to elucidate particular relationships between poverty and child development. Parrallels are once again easy to draw to the child abuse literature. In fact, in her research Elmer (1977) recently was unable to document significant developmental differences between abused and nonabused children reared in similarly dissonant social milieux. Typically, investigations have identified poverty, stress in the current household, historical

stress and lack of social support to be highly predictive of abuse (Newberger et al., 1977; Gelles, 1973). We found similar socioenvironmental stressors to be predictive of both mother-infant interaction and maternal perception of infant temperament. These relations obtained for the subsample of poor families as well as for the entire sample.

Such linear relations between poverty-related stress measures and mother-infant relational items would seem to imply that perceived stressors such as interpersonal conflicts, impaired emotional state, stressful life events, and inadequate material and social supports mediate between poverty and development in some sort of mutually debilitating fashion. Consequently, one may question the notion that class differences in childrearing studies are merely subcultural variations demarcating different styles of living but not in any direct manner relating to degree of disadvantage (Tulkin, 1972). Cultural deprivation, a term under attack by liberal psychologists for some years now, may be just the appropriate expression to connote those most disadvantaged families in the bottom social strata. Our results also suggest that class differences found in previous childrearing and interaction studies (e.g. Tulkin, 1972) may largely reflect depressed scores of those most stressed subjects in the lower-class group and, in fact, may not be representative of real subcultural differences per se. Indeed many of our class 4 dyads, poor by middle-class standards, still obtained low stress scores and exhibited

patterns of interaction and reports of baby temperament characteristic of our low-stress middle-class families.

These relations may also shed some light upon how social stressors work to distort meaningful mother-infant communication and more generally family development. Intercorrelations between stress variables (Table 3) indicated that there was no single strand of influences acting in isolation to any other. The fabric of family structure is composed of a network of interdependent intrapsychic, social and material resources, and this may help to explain Kessler's (1966) conclusion that severe stresses of poverty preclude the possibility of a stable family organization.

The more stressed our mother-baby dyads, the more their interactions could be characterized as essentially nonexploratory, discouraging and devoid of communicational clarity. The more likely also the mother was to perceive her child's temperamental attributes as tending toward difficulty. Furthermore, we found that mothers would exhibit increasingly poorly differentiated perceptions of their baby's temperament as their socioeconomic conditions worsened. In other words, with increasing stress mothers would display greater uncertainty and inconsistencies in characterizing their babies as, for example, either withdrawn or approaching, predominant jolly or irritable, regular or irregular.

The actual picture that emerges with regard to our mother-infant relational variables is rather complex. Temperament, differentiation of perception of temperament and

social stress variables were each related to the other and also associated with various measures of mother-infant interaction. Adequacy of material resources turned out the best all-round predictor, and it would appear likely to have been, in a general sense, a major causative factor influencing the other variables since it would be very difficult to infer causality in any other direction. Hence adequacy of material resources appeared strongly to contribute to the degree of maternal differentiation of temperament perception, the type of temperament perceived and the overall quality of mother-infant interaction. The questions still remain, however, as to (1) whether maternal perception of infant temperament accurately reflected the child's actual temperament, and (2) whether either, independent of poverty-related stress, influenced the nature of mother-infant interaction.

The first query can only be addressed very sketchily. Insofar as degree of differentiation of temperament perception was directly related to adequacy of material resources, one might suppose that with declining adequacy of socioeconomic environment, the relation of perception of temperament to actual temperament would have decreased in veridicality. According to this reasoning, a well-adjusted, reasonably content middle-class mom would be more precise in assessing her baby's behavioral style than a desperately overwhelmed lower-class mother who would be more likely to perceive her baby in difficult terms. Yet it is also possible that the

manner in which any mother perceives her child may initially be largely a projection of her own feelings of worth and ease (see Tables 7 and 8 for associations between maternal psychological functioning and infant mood, staccato bursts and infant threshold, and maternal verbal bids and baby activity), and that this may in turn actually influence the emerging temperament of the infant through the behavioral interaction which occurs. A stressed mother's negative perceptions of her baby may produce accompanying negative maternal behavior which then could consistently elicit difficult infant responses. What is suggested is a self-fulfilling prophecy in which infant temperament is influenced by social conditions through the mediating influence of maternal perception of the child's behavior.

Regarding the second question of the relation between temperament and parent-child interaction, several investigations have explained differences in interactions as largely attributable to variations in child temperament (Thomas et al., 1968; Sameroff, 1978). For example, Sameroff (1978) suggested that relations between perception of difficult temperament and maternal ignoring and avoident interactive behavior indicated that mothers with difficult babies were likely to tune them out as aversive stimuli. Our own data implies another interpretation. An analysis of covariance adjusted for material resources reduced the effects of perception of temperament upon mother-infant interaction to insignificance with most of the interaction variables tested. Where

perception of temperament did maintain an effect, it was noticeably reduced from its simple r^2. What these earlier studies inferred as temperament appears to have been grossly confounded with parental environmental and attitudinal characteristics. It appears to have been the level of material resources, covarying with temperament perception, that really was reponsible for the associations with mother-infant interaction. Consequently previous inferences concerning the effects of temperament upon parent-child relations seem largely unfounded.

In a more general sense, these findings address the issue concerning the magnitude of behavioral effects the child typically exerts upon his parents. In fact the present study probably serves as a rather good test for the demonstration of specific effects the infant may have upon its caregiver. The premature infant has been distinguished from the full-term baby on the basis of his aversive cry and unpleasant appearance, and these characters have been suggested to predispose him to relational difficulties with his parents (Frodi et al., 1978). Our findings, however, do not in any sense substantiate this theory or any other which suggests that the preterm baby typically exerts powerful effects upon his mother's behavior. Only one behavior related to the mother--mutual gaze--differentiated premature from full-term groups. The composite measures of positive and negative interactional behaviors, as well

as the overall proportion of mutual positive attentiveness, demonstrated almost zero-order correlations with prematurity and complication scores while being strongly related to measures of poverty-related stress.

Our results are especially interesting since analysis of the relation of macrolevel social environmental processes to the microlevel mother-infant bond revealed important influences which would otherwise have been completely concealed had the mother-infant dyad been studied as an isolated unit. Though effects due to prematurity would still have been negligible, variations in maternal perceptions of temperament might well have been viewed as real temperamental differences playing a very significant role in influencing various qualitative dimensions of the mother-infant relation. This underlines the importance of studying families as systems embedded in several hierarchical layers of sociopolitical contexts.

Our choice of hypotheses and measures was guided by the notion that women under a combination of severe psychosocial and economic stress would be overwhelmed by external stimuli. Consequently they would feel helpless and anxious, justifiably believing that their lives were controlled by powerful sources external to them (Ramey & Campbell, 1976). This combination of anxiety and lack of control would, in turn, yield a sense of depression, rejection, negativity, frustration and a general feeling of impotence with regard to effecting changes in their own lives or their children's

Sarason, Hill & Zimbardo (1965) found a strong association between anxiety and the incapacity to learn and meaningfully incorporate new information. We believed that the developing communication signals of the infant represented just such new units of information which the chronically stressed mother would be unable to decode or incorporate. We indeed found that severely disadvantaged mothers did not pick up on their infant's cues (maternal positive regard), were intrusive and oftimes overwhelming and disorganized in their own attempts to gain baby's attention (interfering touch and staccato bursts) and seemed to have a relatively poorly differentiated view of what their babies were like. Additionally these mothers were more likely to be critical and negative with their infants than less stressed women.

What we did not expect so dramatically to find was a relation--already at 6 months of age--between infant avoidant responses, and quality of socioeconomic environment. Perhaps even more impressive than the statistical association was the frequently encountered stereotyped nature of the actual behavioral act. A mother would make a bid for interaction to which the infant responded by a quick glance followed by his literally turning his back upon her. Such a dorsal orientation obviously and abruptly cut off further social exchange. Indeed the significant level of mother-infant avoidance and negativity demonstrated for more stressed dyads may well in and of itself pose significant

developmental problems. Both perception of difficult baby temperament and lack of a responsive social environment during infancy have been associated with deficits in later adaptive functioning (Elardo et al., 1975, Semeroff, 1973)

Our findings suggest that socioenvironmental stresses, covarying with temperament perception and mutual social responsivity, largely serve as barriers to an infants' sense of developing competence. Without a positive atmosphere of contingent and appropriate social responsiveness, the seeds may already be planted for the infant's own emerging sense of powerlessness in the world, his early efforts to acquire mastery answered by feelings of ineffectiveness. Smith (1969) has proposed that self-perception of competence is related to productive engagement with the environment. Being an effective person within society, he writes, gives one hope and the feeling of an ability to set goals for oneself. Severe stresses of poverty appear to preclude development of this sense of competence for parent and child.

In any study of this nature certain methodological difficulties are likely to occur, and these, of course, must be mentioned. Perhaps the most serious problem that we encountered was an uncontrollable self-selection process for our preterm group. Approximately one-third of those PT families scheduled for medical and developmental evaluation failed to show up for their appointments, and it was impossible to ascertain whether these families differed in any important ways from those who did make themselves available

for study. Such procadural flaws of coursa nacassarily must temper the limits of ganaralizability concarning our findings. Equally convincing arguments can ha made for parents of the absent group either being justifiably uncon-carnad about thair infants or, on the othar haud, downright naglactful of them. Howavar, sinca almost all thosa falling to attend lived far away from thair appointmant and thus would hava had to travai long distancas to cema, it is also plausible that many parants might have felt that their local dactar or clinic was adequate to their child's naads.

Bacausa of the obvious constraints of daaling with relatively uncommon natural phanomana such as prematurity, tha laval of control ona can axart over extranaous variablas is fraquantly lass than optimal. Consaquantly savaral charactaristics, a.g. praciaa aga of infant and parity, ware not as well controliad as wa would hava likad. Still it is notaworthy that ralations obtained between predictor and criterion maasuras ware oftan vary significant in spita of thasa sourcas of extraneous variation.

Somathing which from tha vary incaption of investigation was considered a potantially quita threatening problam was tha natura of the interactional data baing collectad. Mother-infant interaction consistad of a four-minuta frea-play parlod in an unfamiliar, if physically comfortabla, hospital satting in which a vidaocamara and camaraman ware paaring down upon both baby and mother. Confidanca in tha paradigm was at best shaky. Could anything ba gainad from such

observations? Were mother and baby behaving in any way typical of their home interactions? Could important qualitative differences be assessed in a four-minute play period?

Such apprehensive concerns were largely resolved over the course of the study on the basis of both subjective and objective considerations. Dyads showed great variabilities of style for one thing, and with each viewing, the author was left with an increasingly strong impression of characteristic modes of relating between infant and mother. Some couples had very apparently long ago worked out complex and rhythmic patterns of communication, others seemed at a loss for reading each others' signals, while still others demonstrated a mutually hostile and rejecting attitude apparently well embedded in the behavioral repertoire. On a more empirical level the interaction measures did relate to both mothers' perceptions of infant behavioral style as well as stress measures, and such systematic associations in the hypothesized directions would strongly suggest that the behavioral measures reflected various aspects of the 'real' world outside the hospital walls. In fact by the time the observational data were recorded, we were greatly impressed--actually astonished--to find how much one could tell from so little. And there was even some feeling that such observational analysis might well be utilized in the future for certain diagnostic procedures.

Implications of the present study are several and wide ranging. First, our data adds to the increasingly substantial

accumulations of findings (Sameroff & Chandler, 1975; Bronfenbrenner, 1974) which indicates that study of developmental processes in general, and prematurity in particular, must go beyond the level of analysis of the isolated child or family to address the relations of context to development. Specifically with regard to prematurity, we must attempt to elucidate more precisely relations between variations in social milieu, prematurity and their sequelae. Is it true, for instance, that a social etiology of prematurity is much more common for the lower social classes while a more definitively physiologic causation is typical of the upper classes? What does this imply for the developing family and child? Besides obvious physical trauma, do the essentially physiologically caused preterm infants demonstrate as many subtle adverse sequelae as the premature babies with a more social etiology? The present findings lend themselves particularly to certain conclusions, but these are still largely in the realm of speculation.

Another issue which must be further investigated, is the potency of effects the infant typically exerts upon his parents. Our findings imply that there are slight effects, but these are insignificant when compared to the effects of the parent upon the infant. Studies must be designed specifically to assess the relative power of each upon the other.

Related to this issue of infant effects upon caregiver is the whole rejuvenated area of early temperament and its

consequences. There are several questions concerning this literature which arise from the present research. First, our data strongly imply that parental perception of temperament may often be something very different than actual infant temperament. Since most previous temperament studies have confused the two, study should be initiated to see how they are related. Secondly, we found that the effects of perception of temperament upon mother-infant interaction were largely explicable in terms of level of material resources. These results suggest reinterpretation of past findings concerning the directionality of causation in relation to temperament and parent-child interaction. Lastly, our results somewhat suggest that parental stress may actually stimulate development of difficult temperamental characteristics. This argument implies that constitutionality of temperament may be largely a fallacious assumption, and that temperamental style may be significantly molded by both different situations and different people. Such questions also ought to be addressed by future research.

REFERENCES

Abramowicz, M., & Kass, E.H. (1966). Pathogenesis and prognosis of prematurity. New England Journal of Medicine, 266, 1092-1097.

Ainsworth, M.D.S. & Bell, S.M. (1970). Attachment, exploration and separation. Illustrated by the behavior of one-year-olds in a strange situation. Child Development, 41, 49-67.

Ainsworth, M.D.S., & Bell, S.M. (1974). Mother-infant interaction and the development of competence in K. Connelly & J. Bruner, (Eds.), The Growth of Competence. New York: Academic Press.

Bayley, N. (1969). Comparison of mental and motor test scores for ages 1-15 months by sex, birth order, race, geographical location and education of parents. Child Development, 36, 379-394.

Bayley, N., & Schaefer, E. (1960). Relationships between SES and attitudes of mothers toward young children. Journal of Genetic Psychology, 96, 61-77.

Beckwith, L. (1971). Relationships between attributes of mothers and their infants' I.Q. scores. Child Development, 42, 1083-1097.

Beckwith, L., Cohen, S.E., Kopp, C.B., Parmelee, A.H., & Marcy, T.G. (1976). Caregiver-infant interaction and early cognitive development in preterm children. Child Development, 47, 579-587.

Bell, S. (1970). The development of the concept of object as related to infant-mother attachment. Child Development, 41, 291-311.

Blau, A., Slaff, B., Easton, D., Welkowitz, J., & Cohen, J. (1963). The psychogenic etiology of premature births: a preliminary report. Psychosomatic Medicine, 25, 201-211.

Braine, M.D.S., Hermer, C.B., Wortis, H., & Freedman, A.M. (1966). Factors associated with impairment of the early development of prematures. Monograph of the Society for Research in Child Development, No. 31.

Bronfenbrenner, U. (1974). Developmental research, public policy and the ecology of childhood. Child Development, 45, 1-13.

Brown, G.W., & Birley, J.L. (1968). Crises and life changes and the onset of schizophrenia. Journal of Health and Social Behavior, 9, 203-214.

Brown, G.W., Brolchain, M.N., & Harris, T. (1975). Social class and psychiatric distnrbance among women in an urban population. Sociology, 8, 225-254.

Caplovitz, D. (1963). The Poor Pay More. New York: Free Press.

Caputo, D.V., & Mandell, W. (1970). Consequences of low birth weight. Developmental Psychology, 3, 363-383.

Caputo, D.V., Taub, H.B., Goldstein, K.M., Smith, N., Dalack, J.D., Purnsner, J.P., & Silberstein, R.M. (1974). An evaluation of various parameters of matnrity at birth as predictors of development at one year of life. Perceptual Motor Skills, 39, 631-652.

Carey, W.B., Fox, M., & McDevitt, S.C. (1977). Temperament as a factor in early school adjustment. Pediatrics, 60, 621-624.

Clarke-Stewart, K.A. (1973). Interactions between mothers and their young children: characteristics and consequences. Monograph of the Society for Research in Child Development, No. 153.

Cohen, S.E., & Beckwith, L. (1977). Caregiving behaviors and early cognitive development as related to ordinal position in preterm infants. Child Development, 48, 152-157.

Cohler, B.J., Gallant, D.H., Grunebaum, H.U., Weiss, J.L., & Garner, E. (1975a). Pregnancy and birth complications among mentally ill and well mothers and their children. Social Biology, 22, 269-278.

Cohler, B.J., Grunebaum, H.U., Weiss, J.L., Hartman, C.R., & Gallant, D.H. (1975b). Perceived life stress and psychopathology among young mothers of young children. American Journal of Orthopsychiatry, 45, 58-73.

Copans, S A (1974). Human prenatal effects: methodological problems and some suggested solutions. Merrill-Palmer Quarterly, 20, 43-52.

Crellin, E. (1971). Born Illegitimate: Social and Educational Implications. Slough, England: National Foundation of Educational Research.

Davids, A., Holden, R., & Gray, G. (1963). Maternal anxiety during pregnancy and adequacy of mother and child adjustment eight months following childbirth. Child Development, 34, 993-1002.

Dohrenwend, B P. (1975). Sociological and social psychological factors in the genesis of mental disorders. Journal of Health and Social Behavior, 16, 365-392.

Dohrenwend, B P., & Dohrenwend, B.S. (1969). Social Status and Psychological Disorder. New York: Wiley.

Dohrenwend, B S., & Dohrenwend, B P. (1974). Stressful Life Events. New York: Wiley.

Douglas, J W B. (1960). "Premature' children at primary school. British Medical Journal, 1, 1008-1013.

Douglas, J W B., & Gear, R. (1976). Children of low birth weight in the 1946 National cohort. Archives of Diseases in Childhood, 51, 820-826.

Drillien, C M. (1964). Growth and Development of the Prematurely Born Infant. Baltimore: Williams & Wilkins.

Drillien, C M. (1970). Small for date infants: Etiology and prognosis. Pediatric Clinics of North America, 17, 9.

Drillien, C M. (1972). Aetiology and outcome in low-birthweight infants. Developmental Medicine and Child Neurology, 14, 563-573.

Elardo, R., Bradley, R., & Caldwell, B M. (1975). Relations of infant's home environment to mental test performance from 6 to 36 months: a longitudinal study. Child Development, 46, 71-76.

Elardo, R., Bradley, R., & Caldwell, B M. (1977). A longitudinal study of the relation of infant home environments to language development at age 3. Child Development, 48, 595-603.

Elmer, E. (1977). Fragile Families, Troubled Children. Pittsburgh: University of Pittsburgh.

Ferreira, A.M. (1965). Emotional factors in prenatal environment: a review. Journal of Nervous and Mental Disease, 141, 108-118.

Field, T.M. (1977). Effects of early separation, interactive deficits and experimental manipulations on infant-mother face-to-face interaction. Child Development, 48, 763-771.

Fomufod, A.K. (1976). Low birth weight and early neonatal separation as factors in child abuse. Journal of National Medical Association, 68, 106-108.

Friedrich, W.M., & Boruskin, J.A. (1976). The role of the child in abuse: a review of the literature. American Journal of Orthopsychiatry, 46, 580-590.

Frodi, A.M., Lamb, M.E., Leavitt, L.A., Donovan, W.L., Neff, C., & Sherry, D. (1978). Fathers' and mothers' responses to the faces and cries of normal and premature infants. Developmental Psychology, 14, 490-498.

Frommer, E.A., & Shea, G. (1973). The importance of childhood experience in relation to problems of marriage and family building. British Journal of Psychiatry, 123, 157-168.

Garbarino, J. (1977). The human ecology of child maltreatment: a conceptual model for research. Journal of Marriage and the Family, 39, 721-736.

Garbarino, J., & Crouter, A. (1978). Defining the community context for parent-child relations: the correlates of child maltreatment. Child Development, 49, 604-616.

Gelles, R.J. (1973). Child abuse as psychopathology - a sociological critique and reformulation. American Journal of Orthopsychiatry, 43, 611-621.

Gil, D. (1971). Violence against Children. Cambridge: Harvard.

Golden, M., & Birns, B. (1976). Social class and infant intelligence. In Lewis, M., (Ed.), Origins of Intelligence. New York: Plenum.

Goldstein, K., Caputo, D., & Taub, H.B. (1976). Effects of prenatal and perinatal complications on development at one year of age. Child Development, 47, 613-621.

Gordon, I.J. (1969). Early Child Stimulation through Parent Education. Washington: H.E.W.

Gorsuch, R.L., & Key, M.K. (1974). Abnormalities of pregnancy as a function of anxiety and stress. Psychosomatic Medicine, 36, 352-363.

Gunter, L.M. (1963). Psychopathology and stress in the life experience of mothers of premature infants: a comparative study. American Journal of Obstetrics and Gynecology, 86, 333-340.

Hamburg, D.A., Coelho, G.V., & Adams, J. (Eds.) (1974). Coping and Adaptation. New York: Basic Books.

Hess, R.D., & Shipman, V.C. (1966). Maternal attitude toward the school and the role of the pupil: Some special class comparisons. Proceedings of the Conference on Curriculum and Teaching in Depressed Urban Areas. New York.

Hetzel, B.X., Breuer, B., & Poidivin, L.O. (1961). A survey of the relationships between common antenatal complications in primiparae and stressful life events during pregnancy. Journal of Psychomatic Research, 5, 175-182.

Hollingshead, A.B., & Redlich, F.C. (1958). Social Class and Mental Illness. New York: Wiley.

Honig, A.S., & Lally, J.R. (1973). Assessing the behaviors of caregivers. Catalog of Selected Documents on Psychology, Vol. 3.

Hunter, R.S., Kilshon, M., Kraybill, E.N., & Loda, F. (1978). Antecedents of child abuse and neglect in a newborn intensive care unit. Pediatrics, 61, 629-635.

Justice, B., & Duncan, D.F. (1976). Life crises as a precursor of child abuse. Public Health Reports, 91, 110-116.

Keeler, S. (1966). The American Lower Class Family. Albany: Division for Youth, State of New York.

Klaus, M.H., & Kennell, (1976). Maternal-Infant Bonding. Saint Louis: Mosby.

Klein, M., & Stern. (1971). Low birth weight and the battered child syndrome. American Journal of Diseases in Children, 122, 15-19.

Knobloch, H., & Pasamanick, B. (1959). Syndrome of minimal brain damage in infancy. Journal of the American Medical Association, 170, 1384-1388.

Knobloch, H., & Pasamanick, B. (1962). Mental subnormality. New England Journal of Medicine, 266, 1092-1097.

Kramer, M. (1957). A discussion of concepts of incidence and prevalence as related to epidemiologic studies of medical disorders. American Journal of Public Health, 47, 826-840.

Leidermen, P.H. (1978). The critical period hypothesis revisited: mother to infant social bonding in the neonatal period. In F.D. Horowitz (Ed.), Early Developmental Hazards: Prediction and Precautions. Boulder: Westview.

Lewis, O. (1965). La Vida. A Puerto Rican Family in the Culture of Poverty. New York: Random House.

Liebow, E. (1964). Tally's Corner. A Study of Negro Streetcorner Men. Boston: Little Brown.

Lillienfeld, A.M., & Parkhurst, E. (1951). A study of the association of factors of pregnancy and parturition with the development of cerebral palsy. American Journal of Hygiene, 53, 262-278.

Lillienfeld, A.M., & Pasamanick, B. (1954). Association of maternal and fetal factors with the development of epilepsy. I. Abnormalities in the prenatal and perinatal periods. Journal of the American Medical Association, 155, 719-732.

Lillienfeld, A.M., & Pasamanick, B. (1955). Association of prenatal and perinatal factors with the development of cerebral palsy and epilepsy. American Journal of Obstetrics and Gynecology, 70, 93-104.

Lubchenko, L.O., Horner, F.A., & Reed, L.H. (1963). Sequelae of premature birth. American Journal of Diseases in Children, 106, 101-115.

MacDonald, A.D. (1964). Intelligence in children of very low birthweight. British Journal of Preventive and Social medicine, 18, 59-74.

MacDonald, A.D. (1967). Children of Very Low Birthweight. London: Heinemann.

McDonald, R.L. (1968). Role of emotional factors in obstetric complications: a review. Psychosomatic Medicine, 30, 222-237

McKeown, T., & Record, R. G. (1971). Early environmental influences on the development of intelligence. British Medical Bulletin, 27, 48-52.

Markush, R. E., & Favero, A. V. (1974). Epidemiological assessment of stressful life events, depressed mood and psychophysiological symptoms--a preliminary report. In Dohrenwend, B. P. (Eds.), Stressful Life Events. New York: Wiley.

Miller, H. C., Hassanein, K., & Hensleigh, P. A. (1976). Maternal factors in the incidences of low birthweight infants among black and white mothers. Pediatric Research, 12, 1016-1019.

Minturn, L., & Lambert, W. W. (1964). Mothers of Six Cultures. New York: Wiley.

Myers, J. K., Lindenthal, J. J., & Pepper, M. P. (1974). Social class, life events and psychiatric symptoms. In Dohrenwend, B. S., & Dohrenwend, B. P. (Eds.), Stressful Life Events. New York: Wiley.

Myers, J. K., Lindenthal, J. J., & Pepper, M. P. (1975). Life events, social integration and psychiatric symptomatology. Journal of Health and Social Behavior, 16, 421-427.

National Academy of Sciences (1973). Infant Death: An Analysis by Maternal Risk and Health Care. Washington, D. C.: Institute of Medicine.

Neligan, G. A., Kolvin, I., Scott, D. M., & Garside, R. F. (1976). Born Too Soon or Born Too Small. Clinics in Developmental Medicine No. 61. London: Heinemann.

Newburger, E. H., Reed, R. B., Daniels, J. H., Hyde, J. H., & Kotelchuck, M. (1977). Pediatric social illness: toward an etiologic classification. Pediatrics, 60, 178-185.

Niswander, K. R., & Gordon, M. (Eds.) (1972). The Collaborative Perinatal Study of the National Institute of Neurological Diseases and Stroke: The Women and their Pregnancies. Philddelphia: Saunders.

Nuckolls, K. B., Cassel, J., & Kaplan, B. H. (1972). Psychosocial assets, life crisis and the prognosis of pregnancy. American Journal of Epidemiology, 95, 431-441.

Oppel, W. C., & Royston, A. B. (1971). Teenage births: Some social, psychological, and physical sequelae. American Journal of Public Health, 61, 751-756.

Osofsky, H.J., & Kendall, N. (1973). Poverty as a criterion of risk. Clinics in Obstetrics and Gynecology. 16, 103-119.

Ottinger, D., & Simmons, J. (1964). Behavior of human neonates and prenatal maternal anxiety. Psychological Reports, 14, 391-394.

Parke, R.D., & Collmer, C.W. (1975). Child Abuse: an interdisciplinary analysis. In Hetherington, E.M., (Ed.), Review of Child Development Research. Vol. 5. Chicago: University of Chicago.

Parmelee, A.H., & Haber, A. (1973). Who is the "risk infant"? Clinical Obstetrics and Gynecology. 16, 376-387.

Parmelee, A.H., Kopp, C.B., & Sigman, M. (1976). Selection of developmental assessment techniques for infants at risk. Merrill-Palmer Quarterly, 22, 177-199.

Pasamanick, B., & Lilienfeld, A.M. (1955). Maternal factors in the development of mental deficiency. Journal of the American Medical Association 159, 155-172.

Paykel, N. (1974). Life stress and psychiatric disorder--applicatian of the clinical approach. In Dohrenwend, B.S., & Dohrenwend, B.P. (Eds.), Stressful Life Events. New Yurk: Wiley.

Pedersen, F.A. (1976). A methodology for assessing parental perception of infant temperament. Paper presented at Fourth Biennial Southeastern Conference on Human Development, April, 1976.

Ramey, C.T., & Campbell, F.A. (1976). Parental attitudes and poverty. Journal of Genetic Psychology. 128, 3-6.

Ramey, C.T., Stedman, D.J., Borders-Patterson, A., & Mentel, W. (1978). Predicting school failure from information available at birth. American Journal of Mental Deficiency, 82, 525-535.

Record, R.G., McKeown, T., & Edwards, J.H. (1969). Annals of Human Genetics, 33, 61-71.

Reed, D.M., & Stanley, F.J. (1977). The Epidemiology of Prematurity. Baltimore: Urban and Schwarzenberg.

Richardson, S.A. (1976). The relation of severe malnutrition in infancy to intelligence of school children with differing life histories. Pediatric Research, 10, 57-61.

Robinson, N.M., & Robinson, N.G. (1965). A followup study of children of low birthweight and control children of schoolage. Pediatrics, 35, 425-433.

Rotter, J.B. (1965). Generalized expectancies for internal vs. external control of reinforcement. Psychological Monograph, 80, 1-28.

Rubin, R.A., Rosenblatt, C., & Balow, B. (1973). Psychological and educational sequelae of prematurity. Pediatrics, 52, 352-363.

Rutter, M., & Quinton, D. (1977). Psychiatric disorder-ecological factors and concept of causation. In McGurk, H. (Ed.), Ecological Factors in Human Development. Amsterdam: North Holland.

Rutter, M., Tizard, J., & Whitmore, K. (1970). Education, Health and Behavior. London: Longmans.

Sameroff, A.J. (1978). Caretaking or reproductive casualty? Determinants in developmental deviancy. In F.D. Horowitz (Ed.), Early Developmental Hazards: Predictions and Precautions. Boulder: Westview.

Sameroff, A.M., & Chandler, M.J. (1975). Reproductive risk and the continuum of caretaking casualty. In F. Horowitz (Ed.), Review of Child Development Research, Vol. 4. Chicago: University of Chicago.

Sarason, S., Hill, K., & Zimbardo, P. (1965). A longitudinal Study of the Relation of Test Anxiety to Performance on Intelligence and Achievement Tests. Chicago: University of Chicago.

Schaefer, E.S. (1970). Need for continuing and early education. In Denenberg, V.H. (Ed.), Education of the Infant and Young Child. New York: Academic.

Schwartz, J.L. (1977). A study of the relationship between maternal life change events and premature delivery. In Schwartz, J.L., & Schwartz, L.H. (Eds.), Vulnerable Infants. New York: McGraw-Hill.

Sears, R.R., Maccoby, E.E., & Levin, H. (1957). Patterns of Childrearing. New York: Harper & Row.

Shipman, V.C., & Hess, R.D. (1966). Early experiences in the socialization of cognitive modes in children. A study of urban negro families. Proceedings of the Meeting of the Conference on the Family and Society: Merrill-Palmer Institute, 1965.

Sills, J.A., Thomas, L.J., & Rosenbloom, L. (1977). Nonaccidental injury. A two-year study in central Liverpool. Developmental Medicine and Child Neurology, 19, 25-33.

Smith, A.C., Flick, G.L., Ferriss, G.S., & Sellman, A.H. (1972) Prediction of developmental outcome at seven years from prenatal, perinatal and postnatal events. Child Development, 43, 495-507.

Smith, M.B. (1968) Competence and socialization. In J.A. Clausen (Ed.), Socialization and Society. Boston. Little, Brown.

Somtag, L. (1966). Implications of fetal behavior and environment for adult personalities. Annals of the New York Academy of Science, 134, 782-786.

Spielberger, C.D. (1975). Anxiety: state-trait-process. In Spielberger, C.D. & Sarason, I.G. (Eds.), Stress and Anxiety. Vol. 1. Washington. Hemisphere.

Srole, L. (1962). Mental Health in the Metropolis. The Midtown Manhattan Study. New York: McGraw-Hill.

Stayton, D., Hogan, R., & Ainsworth, M.D.S. (1971). Infant obedience and maternal behavior: origins of socialization reconsidered. Child Development, 42, 1057-1069.

Stott, D.H. (1957) Physical and mental handicaps following disturbed pregnancy. Lancet, I, 1006-1012.

Ieberg, A., Hodgeman, J.E., Ju, P.Y.K., & Spears, R.L. (1977) Recent improvement in outcome for the small premature infant. Clinical Pediatrics, 16, 3-7-313.

Thomas, A., Chess, S., & Birch, H. (1968). Temperaments and Behavior Disorders in Children. New York: New York University.

Tilford, J.A. (1976) The relationship between gestational age and adaptive behavior. Merrill-Palmer Quarterly, 22, 319-326.

Tulkin, S.R. (1972). An analysis of the concept of cultural deprivation. Developmental Psychology, 6, 326-329.

Tulkin, S.R., & Cohler, B.J. (1973). Childrearing attitudes and mother-infant interaction in the first year of life. Merrill-Palmer Quarterly, 19, 95-106.

Turner, E.K. (1956). The syndrome in the infant resulting from maternal emotional tension during pregnancy. Medical Journal of Australia, 1, 221-222.

Uhlenhuth, E.H., Lipman, R.S., Balter, M.B., & Stern, M. (1974). Symptom intensity and life stress in the city. Archives of General Psychiatry, 31, 759-764.

Vassiliou, V., Georgas, J., & Vassiliou, A. (1967). Variations in manifest anxiety due to sex, age and education. Journal of Personality and Social Psychology, 6, 194-197.

Wachs, T., Uzgiris, I., & Hunt, J. (1971). Cognitive development in infants of different age levels and from different environmental backgrounds: an exploratory study. Merrill-Palmer Quarterly, 17, 283-317.

Werner, E.E., Simonian, K., Bierman, J.M., & French, F.E. (1967). Cumulative effects of perinatal complications and deprived environment on physical, intellectual, and social development of preschool children. Pediatrics, 39, 490-505.

Wiener, G. (1962). Psychologic correlates of premature birth: a review. Journal of Nervous and Mental Disease, 134, 129-144.

Wiener, G., Rider, R.V., Oppel, W.C., Fischer, R.K., & Harper, P.A. (1965). Correlates of low birthweight: psychological status at 6-7 years of age. Pediatrics, 35, 434-444.

Wiener, G., Rider, R.V., Oppel, W.C., & Harper, P.A. (1968). Correlates of low birthweight: psychological status at 8-10 years of age. Pediatric Research, 2, 110-118.

Willerman, L., Broman, S.H., & Fiedler, M. (1970). Infant development, preschool IQ and social class. Child Development, 41, 69-77.

Wolkind, D. (1976). Childhood separation experiences and psychosocial status in primiparous women--preliminary findings. British Journal of Psychiatry, 128, 391-396.

Wolkind, D. (1977). Women who have been in care--psychological and social status during pregnancy. Journal of Child Psychology and Psychiatry, 18, 179-182.

Wortis, H., Bardach, J.L., Cutler, R., Rue, R., & Freedman, A. (1963). Childrearing practises in a low socioeconomic group: the mothers of premature infants. Pediatrics, 32, 298-307.

Wortis, H., & Freedman, A.M. (1965). Contribution of social environment to the development of premature children. American Journal of Orthopsychiatry, 35, 57-71.

Yarrow, L.J., Klein, R.P., Lamonosco, S., & Morgan, G. (1975). Cognitive and motivational development in early childhood. In Friedlander, B.Z., Sterrit, G.M., & Kirk, G. (Eds.), Exceptional Infant, Vol. 3. New York: Brunner/Mazel.

Yarrow, L.J., Rubenstein, J.L., Pedersen, F.A., & Jankowski, J.J. (1973). Dimensions of early stimulation and their differential effects on child development. In Chess, S., & Thomas, A.(Eds.), Annual Progress in Child Psychiatry and Child Development. New York: Brunner/Mazel.

Zax, M., Sameroff, A.J., & Babigian, H.M. (1977). Birth outcomes in the offspring of mentally disordered women. American Journal of Orthopsychiatry, 47, 218-230.

Ziv, A., & Luz, M. (1973). Manifest anxiety in children of different socioeconomic levels. Journal of Personality and Social Psychology, 16, 224-232.

APPENDIX A
MATERNAL INTERVIEW SCHEDULE

1. Who are the people who live in your household?
   What are their ages and relationships to the child?

Name	Age	Relationship

2. What was the last grade you completed in school?
3. Are you currently employed?
   (1=no/2=parttime or occasional/3=yes)
4. (If employed) What do you do?_____
5. (If employed) How many hours a week do you work?
6. (If employed) How long have you worked there?
7. (If unemployed or part-time) Have you ever been employed full time?
   (1=no/2=parttime or occasional/3=yes)
8. (If yes to 7) How long has it been since your last full time job?
9. (If yes to 7) What did you do?_____
10. What is your marital status?
    (1=single/2=separated/3=divorced/4=widowed/5=married)

11. Have you been married previously? How many times?

12. (If married in 10) Are you and your husband living together now?
(1=no/2=sort of/3=yes)

13. (If yes to 12) How long have you been married?

14. (If yes to 12) Is he the child's father?
(1=no/2=yes/3=not known)

15. (If no to 12) How long have you been separated?

16. Do you live in an apartment or a house? If a house, do you own it or rent it?
(1=apartment/2=house rented/3=house owned)

17. How many rooms does it have? (Excluding bathroom)

18. How long have you lived there?

19. (If 18 is less than one year) How many times have you moved in the past year?

20. Do you have a telephone?
(1=no/2=yes)

21. Can you give me a rough estimate of what your household's monthly income is? (From all sources, after taxes removed)

22. How many people are supported on this income?

23. Do you own or have access to a car?
(1=no/2=sort of, access to/3=yes)

24.- Would you say it's generally easy or difficult for you

25. to get to

24) Shopping

25) Work (if working)

26) Recreation places

(1=very difficult/2=somewhat difficult/3=depends
4=somewhat easy/5=very easy)

27. How often do you read a newspaper a week?

28. How many relatives live around your area? (Adults)

29. How many of these can you count on in times of real need?

30. Do you get together with relatives often? How many times a week?
(1=never, no relatives/2=rarely-up to once every few months/3=sometimes-a few times a month to once a week/4=often-a few times a week/5=very frequently-every day)

31. Do you have any good friends in your neighborhood or nearby area? How many?

32. How many people (either friends or relatives) would be able to help you in taking care of your children for a couple of hours if there was need?

33. Do you belong to any organizations such as social, religious, educational, or political groups? Which ones?

_____

34. How often do you get together with these groups? (Total meetings per month)

--Now I would like to ask you a couple of questions about _____. (The man who lives with or sees the mother presently.) (Mother's male support)--

35. (If unmarried, divorced or separated) Are you seeing someone regularly now?

(1=no/2=yes)

36. (If yes to 35) How long have you been seeing this person?

37. What was the last grade he completed in school?

38. Is he currently employed?
(1=no/2=occassionally, part-time/3=yes)

39. (If employed) What does he do?_____

40. (If employed) How many hours a week does he work?

41. (If employed) How long has he worked there?

42. (If unemployed or part-time) How long has it been since his last full-time job?

--Now I would like to ask you some questions about your child--

43. How many times has the child seen a doctor for problems of illness in the past year? (Excluding Shands visits)

44. How many other times has the child been hospitalized in the past year? (After being taken home)

45. (If hospitalized) For how long?

46. Does your child act like other boys/girls his/her own age? If not, does this bother you?
(1=yes, no problems/2=minor/3=serious)

47. Does your child ever purposely make you angry?

48. In general, what age do you like children better, infants under 2 or toddlers in the 2 to 4 age range?
(1=like infants more/2=like both equally well/3= like toddlers more)

49. Code if dislike mentioned
(1=not mentioned/2=dislike infants/3=dislike both 4=dislike toddlers)

50. Does anyone other than yourself regularly care for your child?
(1=no/2=yes, in minor way/3=yes in major way)

51. (If yes to 50) Who cares for the child?
(1=husband, male figure/2=separated biological father/3=grandparent, great aunt or uncle/4=aunt or uncle/5=other relative/6=friend, neighbor/7=daycare/8=sibling/9=other)

52. (If yes to 50) How many hours per week does this person care for your child?

53. In general, do you and your love partner usually agree about how to discipline your child?
(1=no/2=sort of/3=no husband/4=yes)

54. How often do you play with or sing to your child.
(1=never/2=once a week/3=few times per week/4=almost or every day)

55. How attractive do you feel your baby is?

56. In general, were you happy or unhappy about your pregnancy with (child's name)?
(1=very unhappy/2=somewhat unhappy/3=neutral/4=somewhat happy/5=very happy)

57. How much did your baby weight at birth?
(1 lb.=454 gms/1 oz.=28.4gms.)

58. How would you describe the reletionship between you end your beby during your first two weeks home together? (1=very unpleesent/2=somewhet unpleesent/3=neutrel/ 4=somewhet pleesent/5=very pleesent)

--Now I would like to esk you ebout whet it wes like for you when you were a child.--

59. Did you live with both your perents the whole time you were growing up? (Until 18) (1=no/2=yes)

60. (If no to 59) Why not? (1=death/2=divorce or separetion/3=economic difficulties/ 4=schooling, institutions/5=elways lived with someone else/6=military/7=other)

61.- Then with whom did you live? (Code by appropriete eges)

63. 61) from 0-6
62) from 6-11
63) from 11-18
(1= mother & father/2=mother only/3=mother end stable stepfather/4=mother & meny stepfethers/5=fether only 6=fether & stable stepmother/7=fether & meny stepmothers 8=steble ether relative/9=stable foster perents/10=institutions/11=unsteble chenging reletives, perents/12= unsteble chenging foster perents/13=unknown)

64. How many moves did you meke before you were 18?

65. Would you describe your childhood as heppy or unhappy? (1=very unheppy/2=somewhet unhappy/3=neutrel/4=somewhet heppy/5=very heppy)

66.- Did your perents (M/F/other) ever spank you? Often or
68. occasionally?
(1=never/2=rerely/3=occesionelly/4=often/5=excessive,
severe)

69.- (If yes to 66-68) Did they every hit you other then on
71. your bottom or your hends? Oftew or occesionelly?
(1=never/2=rerely/3=occesionelly/4=often/5=excessive,
severe)

72. Did you feel the wey they disciplined you wes eppropriete?
74. (1=no, too severe/2=no, too lenient/3=sort of, too severe
4=sort of, too lenient/5=yes, eppropriete)

--Now I would like to esk you some questions ebout your husbend. (Mele cereteker)--

75. Did your love pertner live with both his perents the whole time he was growing up? (Until 18)
(1=no/2=yes/3=unknown)

76. (If no to 75) Why not?
(1=deeth/2=divorce or seperetion/3=economic difficulties
4=schooling, institution/5=elweys lived with someone
else/6=militery/7=other/8=unknown)

77.- Then with whom did your love pertner live? (Code by
79. eppropriate age)
77) from 0 to 6 years
78) from 6 to 11 years
79) from 11 to 18 years

(1=mother & father/2=mother only/3=mother & stable stepfather/4=mother & many stepfathers/5=father only 6=father & stable stepmother/7=father & many stepmothers/8=stable other relatives/9=stable foster parents 10=institutions/11=unstable changing parents, relatives/12=unstable changing foster parents/13=unknown)

80. Does your husband describe his childhood as happy or unhappy?
(1=very unhappy/2=somewhat unhappy/3=neutral/4=somewhat happy/5=very happy/9=unknown)

81.- Did your husband every say that his parents (M/F/other)

83. spanked him? Often or occasionally?
(1=never/2=rarely/3=occasionally/4=often/5=excessive severe)

84.- (If yes to 81-83) Did they (M/F/other)ever hit him

96. other than on his bottom or on his hands? Often or occasionally?
(1=never/2=rarely/3=occasionally/4=often/5=excessive, severe)

--Now I would like to ask you some questions about the problems some people have in their family situations.--

87. Do you or anyone else in your household (excluding child) have any particular medical or health problems? How serious would you say it is? What is it?_____
(1=no/2=minor/3=moderate/4=severe)

88. Is there anyone in your household that has a drinking or drug problem? If yes, does this create problems for you in the home?
(1=n/2=mild/3=moderate/4=severe)

89. Has there been a recent death among your close family or friends which has been particularly stressful to you? If yes, how much does it upset you?
(1=no/2=yes, mildly stressful/3=moderately/4=very stressful)

90. (If in a relationship) Does your present relationship provide you with enough or not enough of the emotional support you want?
(1=enough/2=sometimes, sort of/3=not enough/4=not at all)

91. (If not in a relationship) Is there anyone who provides you with emotional support?
(1=no/2=sort of/3=yes)

92. Do you and your love partner ever disagree violently with each other? How often does this occur?
(1=no/2=infrequently/3=sometimes/4=often/5=all the time)

93. If yes, does this ever lead to hitting or throwing things at each other? How often does this occur?
(1=no/2=infrequently/3=sometimes/4=often/5=all the time)

94 Do you feel you're overwhelmed with household tasks and children? How often do you feel this way?
(1=never/2=infrequently/3=sometimes/4=often/5=all the time)

95. How many times a month do you get away by yourself to do something you would like to do?

96. Do you think this is enough time?
(1=not enough/2=enough/3=too much)

97. On the whole, would you describe your present living situation as happy or unhappy?
(1=very unhappy/2=somewhat unhappy/3=neutral/4=somewhat happy/5=very happy)

FAMILY DEVELOPMENT QUESTIONNAIRE (FDQ)

Read or listen to each question and put an X in the space which best describes how you feel.

How do you/would you feel...

	Uncomfortable Incapable Incompetent			Comfortable Capable Competent	
Feeding your baby					
Putting your baby to sleep					
Handling your baby when s/he cries					
Picking up & putting down your baby					
Handing your baby to another person					
Diapering your baby					
Recognizing normal development in children					
Being a parent					
Caring for a sick baby					
Becoming pregnant again					
Having sexual relations during pregnancy					
Providing child care					
Managing your household with a new baby					
Letting other people care for your baby					

Having your love partner care for your baby	___	___	___	___	___
Leaving your baby with a child-care worker	___	___	___	___	___
Talking with a pediatrician	___	___	___	___	___
Functioning on less than eight hours sleep	___	___	___	___	___
Being alone with your baby all day	___	___	___	___	___
Taking care of your own needs since arrival of your baby	___	___	___	___	___
Handling additional family expenses since arrival of your baby	___	___	___	___	___
Recognizing illness in your child	___	___	___	___	___
Knowing what to do if your child is ill	___	___	___	___	___
Handling your moods	___	___	___	___	___
Dealing with your mate	___	___	___	___	___
Dealing with conflicts between you and your mate	___	___	___	___	___
Dealing with fatigue	___	___	___	___	___
Talking to your mate	___	___	___	___	___
Communicating feelings and thoughts to your friends	___	___	___	___	___
Accepting birth defect if you ever were to have such a baby	___	___	___	___	___

Being sick and having to take care of yourself and your baby ____ ____ ____ ____ ____

Love partner's ability as a parent ____ ____ ____ ____ ____

APPENDIX B*
ITEMS USED FOR SOCIAL STRESS MEASURES

I. Present living conditions

A. Material circumstances

1. Income (per capita) (21/22)
2. Housing adequacy (17/1)
3. Large family (3 or more children) (1)
4. Educational achievement (2)
5. Married or not (10,12)

B. Social relations

1. Love partner relationship (Support, 90, argument, 92, parental agreement, 53; violence, 93; FDQ: dealing with mate, 25; husband as parent, 24 & 42)
2. Other social support resources (relatives who can be counted on, 29, visitation with relatives, 30, friends around, 31; total number who could help out, 32, Social groups, 33 & 34; other emotional support, 91, ease of movement, 24-26; newspaper reading, 27)
3. Maternal availability of time (employment, 3; substitute care, 50-52; time off from family, 95)

* Numbers indicate item nos. on Interview schedule. FDQ items refer to Family Development Questionnaire

C Stressful life events

1. Moves within last year (19), recent divorce or separation (15), health problems (87), drug problem (88), recent deaths (89)

II. Psychological components of maternal functioning

1. Psychiatric disturbance (difficulty with moods, FDQ, 34, communication of feeling to friends, FDQ, 29, happiness in present situation, 87, enough time off, 96)

2 Maternal age < 18 (1)

3 Attitudes toward child (acts age, 40, makes her purposely angry, 47, age preference, 48-49, frequency of play with baby, 54, assessment of attractiveness, 55, happiness with pregnancy, 56, relation in last weeks, 58)

4 Feelings of competency in parenting role (FDQ: feeding baby, 1; putting to sleep, 2; handling when he cries, 3; picking up, 4, diapering, 5; recognizing normal development, 7; being parent, 8; caring for sick baby, 8, providing child care, 12, being alone with baby all day, 19; taking care of own needs since baby, 20; handling additional expenses since baby, 21; recognizing illness in baby, 22, knowing what to do if baby ill, 23)

III Maternal childhood history

1. Broken home (before and after 11, 59, 91-93)

2. Stability of family relations (91-93)

3. No. moves before 18 (54)
4. Perception of childhood (65)
5. Parental discipline appropriateness (72-74)
6. Abused as child (72-74)
7. Happy as child (75)

APPENDIX C
SCORING SYSTEM FOR SOCIAL STRESS MEASURES

Material Resources

Income	≤$1200 per capita/year	10 pts
	1201-1500	8 pts.
	1501-2000	6 pts.
	2001-2600	4 pts.
Married (not)		10 pts.
Housing adequacy:	<1 room/person	10 pts.
Large Family:	≤3 children	10 pts.
Educational Achievement:	<6 grade	10 pts.
	8-9	8 pts.
	10-11	7 pts.
	12	5 pts.
	Unfinished College	2 pts.

Love Partner Conflict

-5 pts. for each item with 10 pts. for physical violence

-1 pt. for mild (4)

-3 pts. for moderate (7)

-5 pts for severe (10)

Social Support and Isolation

- No friends and no one who can help out - 10 pts. each (1 friend 7 pts.)
- Other items - 5 pts.

- No points added for lack of social organizations when other supports at least moderately available
- Maternal time off - never w/being employed: 10 pts; rarely or never but not employed; 8 pts., if only caregiver but sometimes goes out: 5 pts.

Stressful Life Events

- Moves, divorces, physical illness, deaths or other discrete stressful situations since birth of infant 10 pts. each

Mother's Psychological Functioning

- Psychological disorder reported 10 pts.
- < 18 years age 10 pts.
- Feelings about moods, adequacy of communication, happiness, enough time off 5 pts. each
- Negative attitudes to infant 5 pts. each
- Feelings of incompetence 5 pts. each

Mother's Childhood History

- Broken home 10 pts.
- Instability of family relations 10 pts.
- 3 or more moves before 18 5 pts.
- Unahppiness in childhood 10 pts.
- Abused as child 10 pts.
- Inappropriateness felt concerning parental discipline 5 pts.

Items scaled similarly to Love Partner Conflict for degree of severity.

APPENDIX D
DEFINITIONS OF MOTHER-INFANT INTERACTIONAL BEHAVIORS

Maternal Behaviors

1. Positive verbalizations. All positive vocalizations including questions, imitates, praise, suggests, focuses verbally.
2. Criticism. Clear request to terminate action or verbalizations which are critical or hostile or derogatory.
3. Contingent verbalization to infant vocalization. Mother either imitates or responds vocally to nondistress vocalization by infant.
4. Nonverbal bids. Positive touch, help, facilitate, provide, gesturing aimed at initiating or elaborating interaction. Getting baby's attention in some nonverbal way.
5. Repetitive nonverbal bids. Repeating the same or similar bids over and over for several 5-sec period. This has a monotonous quality, such as presenting different toys one after the other in a very similar manner.
6. Staccato bursts. Rapid bursts of maternal behavior which allow little or no time for infant response.
7. Affectionate touch. Kiss, pat, hug, nuzzle, etc.
8. Interfering touch. Mother touches baby to distract, inhibit ongoing activity. Includes hitting, moving object from hands, pulling back, etc.

Infant Behaviors

9. Vocalization: Nondistress vocalization.

10. Smiles at mother. Not frowning, not grimacing, not screwing but a glimmer in his father's eyes he's returning to his mother.

11. Explores: Curious visual or manual exploration of environment.

Reciprocal Behaviors

12. Maternal positive responding: Caregiver responds to infant positive bid or distress in a positive manner by permitting, giving, engaging, helping, accepting, etc. Does not include (3).

13. Maternal negative responses. Ignoring or rejecting baby's social bid or ongoing activity either verbally or nonverbally. Examples: Not returning a toy that rolls away from infant, turning away, or stopping a baby's initiations.

14. Baby positive responding: Baby responds to mother's bid positively by smiling, reaching, pointing, vocalizing, etc.

15. Baby's negative responding: Baby responds to mother's bid by fussing, crying, turning away, ignoring, etc.

16. Face-to-face orientation: Mother is in a position facing baby.

17. Mutual gaze: The two faces are in the same vertical and horizontal plane.

Summary Measures

18. Maternal positive regard: Sum of behaviors 1, 3, 7, 12, 17.

19. Maternal negative regard: Sum of behaviors 2, 5, 6, 8, and 13.

20 Proportion positive behavior: Behaviors 1, 3, 7, 10, 12, 14, 17 / 1, 3, 7, 10, 12, 14, 17, 2, 5, 6, 8, 13, 15. This item includes all positive and negative infant and maternal behaviors.

BIOGRAPHICAL SKETCH

The author was born to his parents on a drizzly autumn day almost a third of a century ago. He came out backwards. Toward the end of the following winter, he contracted a serious case of chicken pox and almost died. However, he survived. Somewhat later he plummeted into a severe depression lasting approximately 20 years. In the interim little has been remembered. What has includes a ground out as last batter in the ninth inning of a critical little league baseball game, a six-month sprained ankle when 14 years of age, a man lurking in the shadows with a club in his hand as the author walked to a Carvel ice cream shop in New York City and the event of being kicked out of high school for writing antitheistic poetry on a rabbi's carefully pressed but as yet unworn white dress shirt. As a phenomenologic student of depression, the author developed a tense interest in stress which permitted him to give birth to the present study. Finally able to expel these sources of tension, largely through the efforts of obsessional mental and compulsive physical exertions, he is presently quite a happy and carefree fellow and much more pleasant to be around. He is currently employed by an institute for the study of stress, Amsterdam, the Netherlands.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Robert C. Ziller, Chairperson
Professor of Psychology

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Franz R. Epting
Associate Professor of Psychology

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Audrey S. Schumacher
Professor Emeritus of Psychology

I certify thet I heve read this study end thet in my opinion it conforms to acceptable stenderds of scholerly presentetion and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

W Keith Berg

W Keith Berg
Professor of Psychology

I certify thet I heve read this study and that in my opinion it conforms to ecceptable stendards of scholarly presentetion and is fully edequete, in scope end quality, as a dissertation for the degree of Doctor of Philosophy.

Sol Kramer

Sol Kremer
Reseerch Professor
Department of Anthropology

This dissertation wes submitted to the Greduate Faculty of the Department of Psychology in the College of Liberel Arts and Sciences end to the Greduate Council, end wes eccepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

Merch, 1979

Deen, Graduate School